

THE IRON AGE

THURSDAY, MARCH 14, 1889.

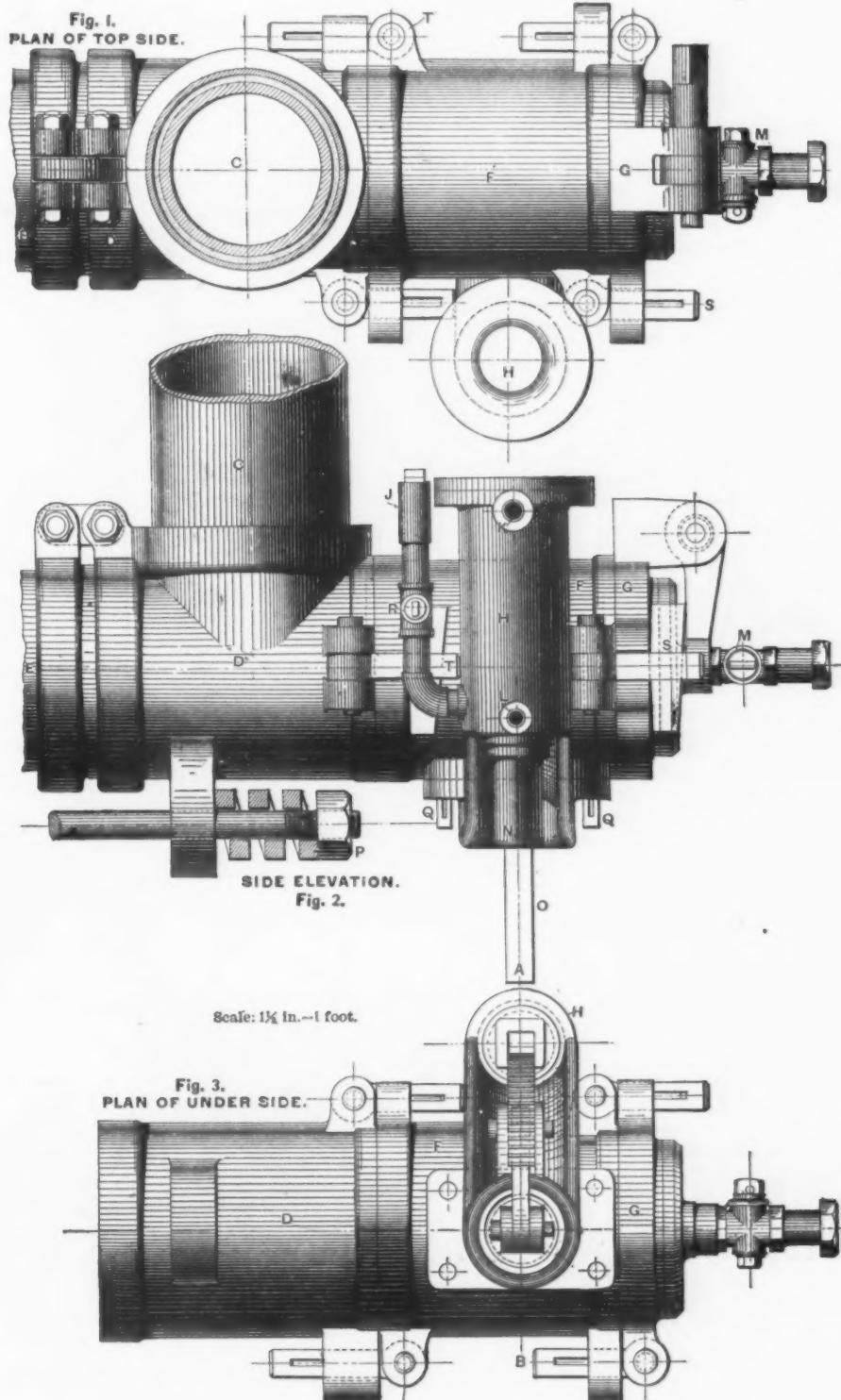
Tuyere Slagging-Valve.*

BY EDGAR S. COOK, POTTSTOWN, PA.

For several years past, dating particularly from the days of serious "ore-dirt" complications at the Warwick Furnace, I

the crucible, or when, from dropping or jumping of stock, the molten slag is forcibly driven into the belly and leg pipes. Various methods were proposed, but objections of one kind or another always presented themselves, and the subject was postponed to a more convenient season.

jacket at one side of the bottom of the water-blocks were found to be of no value whatever. The swinging or hinged cap on the elbow of the belly-pipe, while convenient to permit the removal of slag after the belly-pipe was partially or wholly filled, could not be adapted to discharge



THREE-INCH TUYERE SLAGGING-VALVE, IN USE AT THE WARWICK FURNACE, POTTSTOWN, PA.

have been desirous of providing some safe, quick and easy method of relieving the tuyeres of slag, when the cinder and iron notches are chilled through loss of heat in

In the summer of 1887, while running on anthracite alone, I found the various expedients in use to be so utterly valueless that the importance of a practical tuyere slagging-valve impressed me more forcibly than ever. The holes left in the cast-iron

the slag before solidifying, except at great risk to the men and loss of time just when the constant running of the engine and the keeping of blast on the furnace was of the utmost importance. By removing keys from the caps and holding them in place

* Read at the Buffalo meeting of the American Institute of Mining Engineers.

with props, the slag could be discharged through the tuyeres and belly-pipes, with the engine running, by knocking the props away at a given signal. This method is extremely hazardous to life and limb, and I have always hesitated to make use of it. When the furnace is in such a condition as to require the adoption of some method of the kind, the stoppage of the engine, cooling the blast and the contents of the crucible, always aggravates the trouble. When the caps are blown open and the slag is discharged by removal of the props it is necessary to stop the engine to replace them. An hour or more will elapse before this can be done, as the slag must be partly removed before the tuyeres can be approached by ordinary mortals, and the caps handled and fastened in place again. Any movement of the stock is liable to burn the workman as he stands securing the cap in front or at one side of the open belly-pipe.

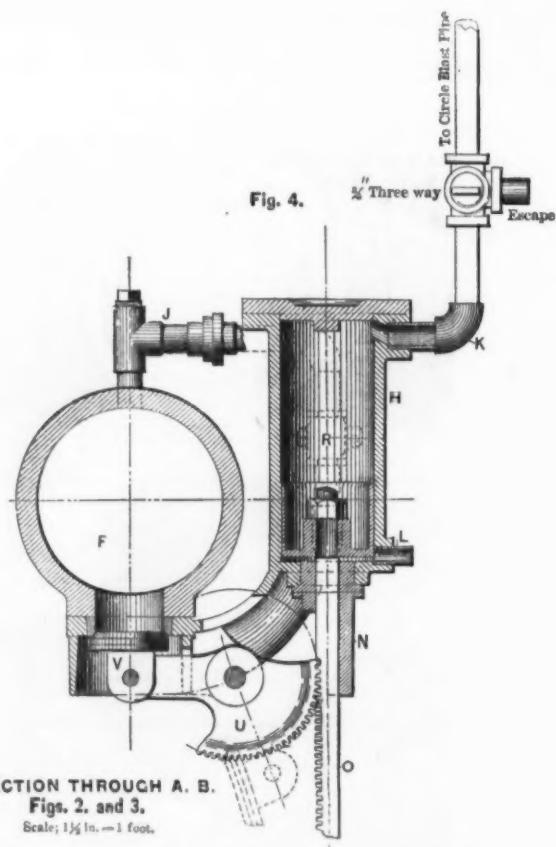
The cooling of crucible contents and the lowering of the heat of the stoves, while thus standing, adds to the difficulty of restoring the furnace to a normal condition and renders necessary a resort to this method a second, third or fourth time, and even oftener, the conditions growing more unfavorable each hour, and thus frequently causes the loss of the furnace which could have been prevented from chilling, while the work was made safe to all engaged, if there had been a quick, easy method of removing the slag through the tuyeres and belly-pipes, without loss of time or heat. We attempted in 1887 to use the method just described, but our belly-pipes filled solid with slag before we could get props in place, the change in the furnace coming unexpectedly and quickly. Several hours were required to clean the pipes. Fortunately, the trouble was only temporary. On starting up again the slag cleared the tuyeres and ran from an enlarged cinder notch without further serious trouble.

This experience brought into existence the tuyere slagging-valve now in use at the Warwick Furnace, and found to be valuable in more ways than one. Our chief engineer suggested that a valve placed in the cap or bottom of the belly-pipe, connected with the piston of a cylinder of larger diameter than the valve and operated with a three-way cock placed in a pipe connecting the cylinder with the main blast-pipe, would afford a safe and sure way of flushing through any belly-pipe without stopping the engine at all. The three-way cock he proposed so to locate at a convenient position that the slag discharged would not interfere with the man operating it. The idea seemed feasible, and orders were given to have one constructed and put into position. The trial of the first valve completed was so satisfactory that we arranged to put similar valves on all our tuyeres, improving the mechanical construction and convenience of the device as we progressed. The accompanying drawings will explain the construction. Figs. 1, 2, 3 and 4 represent the ordinary 3-inch valve.

In these figures, C is the leg-pipe; D, the elbow; E, the belly-pipe; F, the circular casting, keyed to elbow by keys T. This casting carries the valve-seat, held in position by keys Q, and is of the same diameter, external and internal, D, as the elbow. G is the swinging cap of the elbow, held in position by keys S. H is the valve-cylinder, with K opening for connecting pipe running to the circular blast-pipe and a small opening, L, at bottom for the escape to the atmosphere of any air leaking past the piston. M is the usual eye-hole, arranged with a stop-cock to permit the easy cleaning of the glass. N is the guide for the rack-extension, O, of the piston-rod; U, the sector with extended arm, carrying the valve V, and fitted to work easily with rack O. In practice, we found that when

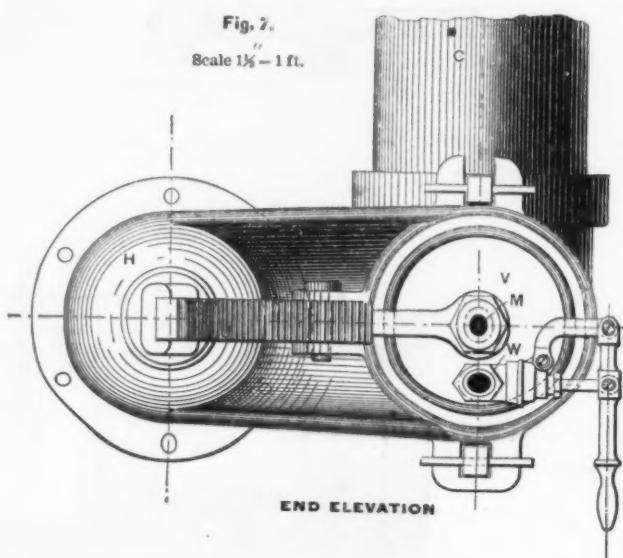
the valve V was thrown open by pressure of air in the belly-pipe (the pressure in valve-cylinder being cut off) owing to its own weight and that of piston and piston-rod, V would partially close again, not enough to interfere with the flow of slag through the opening, but just enough for the slag to strike it and in time cut it. In

the valve V wide open and hold it in the position shown. In pipe J is placed a stop-cock, R, to regulate the amount of air to be admitted to the lower side of the piston. A brass plug, X, is screwed into top of the tee, to facilitate the cleaning of the pipe should it become filled with plumbago or gas-dirt. The



SECTION THROUGH A. B.
Figs. 2, and 3.
Scale: 1 1/2 in. = 1 ft.

THREE-INCH TUYERE SLAGGING-VALVE.



SIX-INCH TUYERE SLAGGING-VALVE

order to hold the open valve in the position shown in Fig. 4, a 4-inch pipe-connection, J, was made from the top of the circular casting, F, to the lower part of the valve-cylinder H. The opening in the cylinder is immediately opposite the piston when the valve is closed. When the valve V is opened and the piston of the cylinder raises, air passes through pipe J to the lower side of the piston and assists to throw

tuyere slagging-valve is easily applied to any of the usual forms of belly-pipes. The connection between it and the main blast-pipe can be made by any one accustomed to put up gas or steam pipe. One main pipe, 1 1/2 inches in diameter, is connected with the main blast or bustle pipe, and from this 4-inch branches are run to the several tuyeres, one to each tuyere-arch. A 1 1/2-inch three-way cock is

SUPPLEMENT TO THE IRON AGE, MARCH 14, 1889.



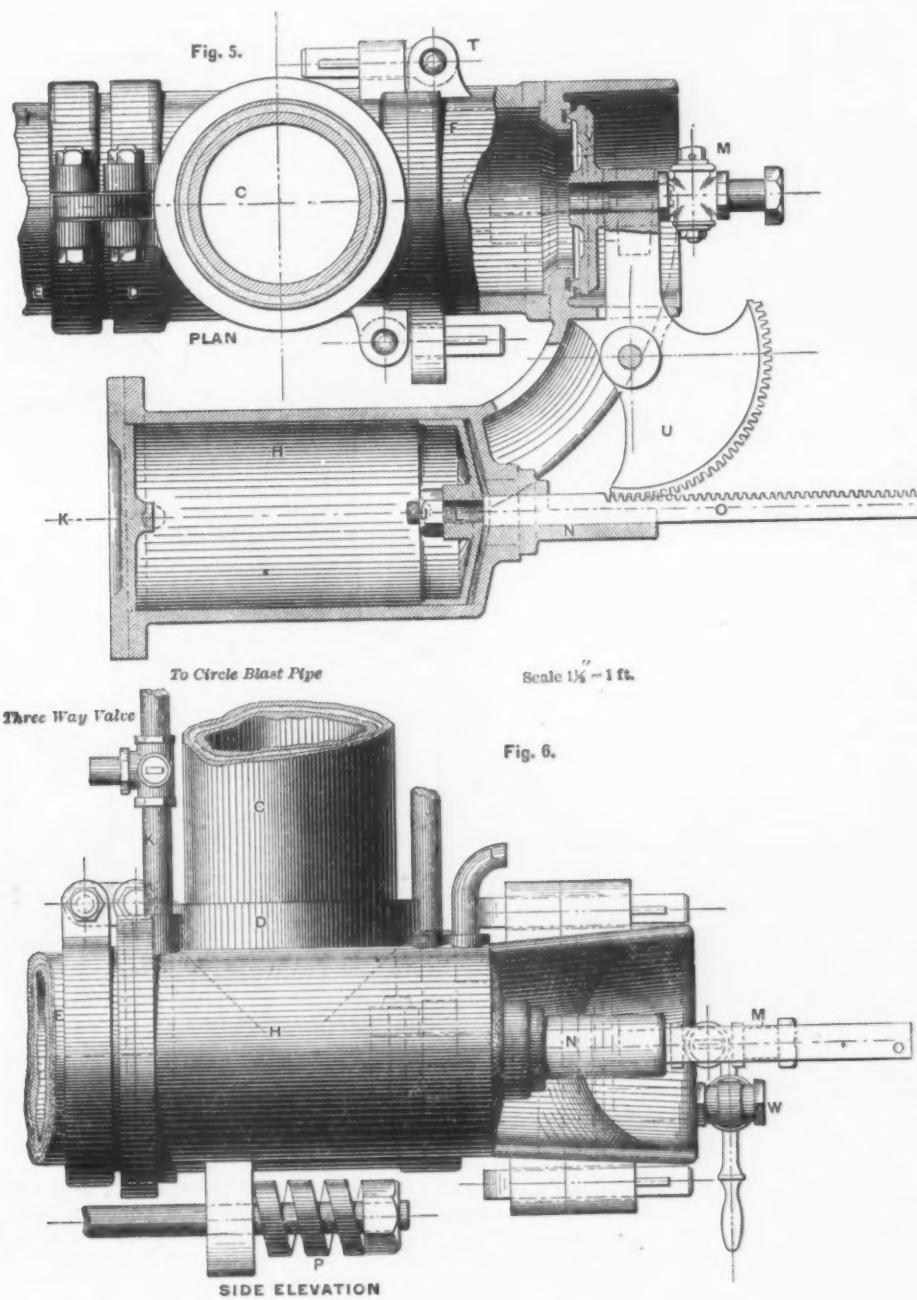
JOHN ERICSSON.

placed in the $1\frac{1}{4}$ -inch pipe and $\frac{1}{4}$ -inch three-way cocks in each of the branches, located as may be found most convenient. The $\frac{1}{4}$ -inch pipe of each tuyere-arch is connected by means of a brass union with the top of the valve-cylinder. To keep the valve closed, the furnace being in operation, the plug of the $1\frac{1}{4}$ -inch three-way cock is so turned that the opening to the atmosphere is closed and the passage from main blast-pipe to branches and cylinders is opened. The $\frac{1}{4}$ -inch cocks are turned

valve the plug of the $\frac{1}{4}$ -inch three-way cock is turned in the opposite direction, closing the passage to the atmosphere and opening communication with the blast-pipe, the pressure from which, acting on the piston of the cylinder, overcomes the resistance of the air in the belly-pipe and closes the valve. By operating the $1\frac{1}{4}$ -inch three-way cock, all of the valves in use, one or six, can be opened instantaneously; or each valve can be used separately by operating the corresponding $\frac{1}{4}$ -

for a moment, thus avoiding all loss of time and all the dangers attending the further cooling off of crucible and blast. The management of a furnace is thus, to some extent, simplified, and one of the most serious annoyances attending the operation of an anthracite furnace is removed —viz., the difficulty of keeping the tuyeres open.

Flushing can be done through the tuyere slagging-valves with the same facility as through the cinder-notch. occasionally



PLAN AND SIDE ELEVATION OF SIX-INCH TUYERE SLAGGING-VALVE.

the same way. The pressure of blast in the belly-pipe is the same as in the valve-cylinder. The area of the piston being larger than the area of the valve in the belly-pipe, the latter is kept tightly closed, never leaking. If it is desired to open a valve, the plug of a $\frac{1}{4}$ -inch three-way cock is turned, cutting off the supply of air from the blast-pipe and opening its passage to the atmosphere. The pressure of blast in the belly-pipe acting upon the valve forces it open, driving up the piston of the valve-cylinder, upon which there is now no pressure. The air filling the cylinders escapes to the atmosphere through the side opening of the cock. To close the

inch three-way cocks. Slag driven into the belly-pipes by the jumping of the stock when the working of the furnace is temporarily deranged can be quickly and easily discharged through one or more of the slagging-valves, without loss of time or any inconvenience whatever. When the crucible is badly chilled the iron and cinder notches are closed and the slag melted by each tuyere is prevented from distributing itself over the area of the crucible, and confined to the immediate vicinity of the tuyere melting it. This slag can be discharged through the tuyere slagging-valves with no risk to the men and without stopping the engine

happens, even in a furnace working well, that a pocket forms under or around a certain tuyere, so that when the engine is stopped this tuyere is sure to fill with slag. When this condition is known to exist, it is only necessary to throw the blast off the furnace, open the valve of the tuyere, put blast on again, blowing slag out, and then stop the engine.

In addition to the uses mentioned, we have found that the tuyere slagging-valves supersede the "pricking" of the tuyeres, and answer the purpose far better. A pricking-rod is now used only when a large hard lump obstructs the nose of a tuyere, which rarely happens. In order

to keep the valves in good working order, it was our custom to open them regularly once or twice per turn. In so doing, we noticed that the tuyeres kept cleaner and brighter than heretofore. Indeed, we never had such uniformly bright and clean tuyeres, under all conditions of working, as we have had since using these valves—some nine months or more. Besides, we never before made so much iron in the same time. A clean, bright tuyere will certainly melt more material per hour than one furred with dirt. The frequent opening of the slagging-valves removes the dirt deposited in the belly-pipes from the gas and the infusible dirt that collects around the nose of each tuyere.

We have found a 3-inch valve the most convenient in size, although we have one 6 inches in diameter. This is shown in Figs. 5, 6 and 7, from which it will be seen that in this form the valve V replaces the ordinary swinging cap, and carries the eye-hole M and the pricker-hole W, the latter being closed by means of a full-way valve, instead of lever and ball. This valve is located on the front tuyere, directly over the iron-notch, and is made to replace the ordinary cap, the eye-sight and pricking-rod holes being in the valve. It can be easily opened to change nozzles. It is safer to operate a valve of this size independently of the others. Its cylinder is connected to the blast-pipe by a separate 1-inch pipe.

We consider that the 6-inch valve would be of more value than the 3-inch one, chiefly in extreme instances of the chilling of the crucible and a large accumulation of dry ore-dirt in the furnace. As now constructed, the 3-inch tuyere slagging-valve can be placed in position in about five minutes, everything being got ready before the stoppage of the furnace after a cast. A circular casting, about 11 inches long, of the same internal and external diameter as the elbow casting of the belly-pipe, is keyed to the elbow in place of the cap, the cap being transferred to the opposite end of the valve-casting. In other words, the ordinary elbow is lengthened by a separate casting 11 inches long. The air-cylinder is permanently attached to this circular casting, carrying the sector and the rack-extension of the piston-rod operating the valve, the valve itself being on the lower side of the casting. The seat of the valve is made detachable, so that it can be renewed should it become worn or cut by the action of the slag.

Recently we allowed considerable slag to accumulate in the furnace. By simply operating the three-way cock of the 6-inch slagging-valve, we flushed through the belly-pipe and valve without any injury either to the pipe or valve. A very slight shell of chilled slag remained in the pipe. The valve was closed easily and tightly by reversing the cock.

On another occasion, shortly before the regular time for flushing, the engine suddenly stopped, in spite of the efforts of the engineer to keep it moving. A joint in the steam-pipe had been remade earlier in the day, and we suppose a chip of wood had somehow got into the pipe and caught on the seat of one of the valves of the engine, thus causing its sudden stoppage. The furnace being full of slag, all the belly-pipes, as the engine stopped without warning, filled immediately. The 6-inch slagging-valve opened automatically from the pressure of the slag in the pipe, draining itself and also the adjoining pipe, the only one on which we had not placed a slagging-valve. The 3-inch valves were opened as quickly as possible by the keeper, by means of a small bar, no air-pressure being in the pipes. From each the slag flowed without difficulty. The delay in opening the 3-inch valves caused a more or less heavy shell to form in the

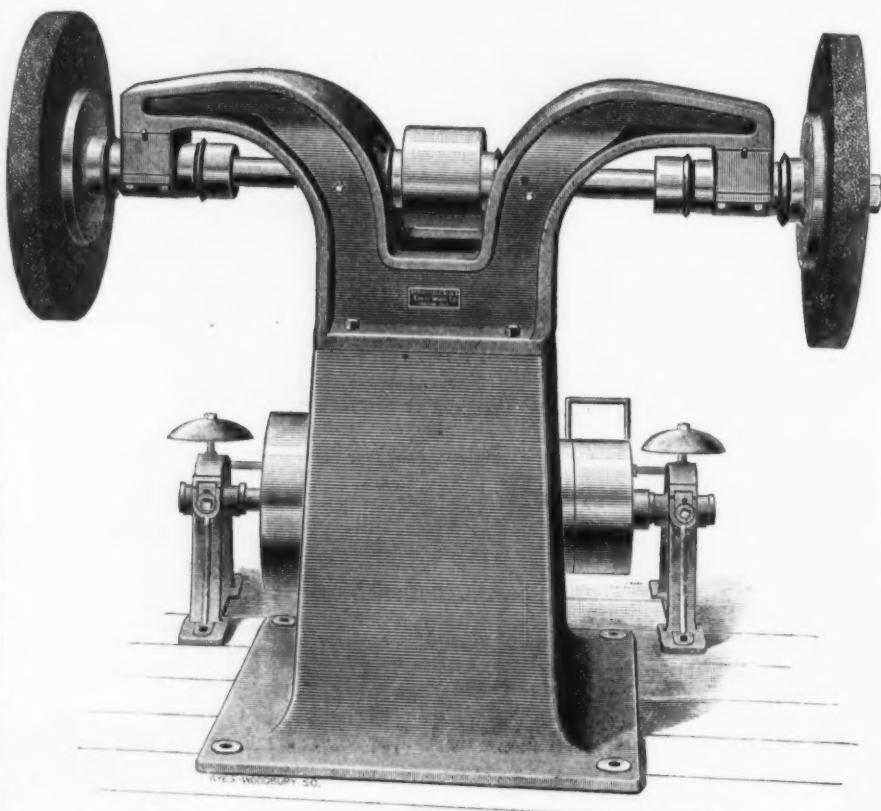
pipes, in contrast with the 6-inch valve, which opened of itself and left but a light shell in its belly-pipe. In half an hour's time all the pipes were perfectly cleaned and we started up again. But for the slagging-valves the pipes would all have been completely filled with slag, which would have solidified before it would have been possible to remove it by means of the ordinary swinging caps, thus entailing a stoppage of four or five hours. Such a long stoppage, coming unexpectedly, might, under some conditions, cause much trouble and additional expense. We think the valves have already repaid us to their original cost.

We are now making blow-off valves for our boilers, constructed on the same principle, with slight modifications to suit the different conditions. Instead of air, steam direct from the boilers is used to operate the valves. Provision is made to guard

length over all is 430 feet, beam 45 feet and depth of hold 30 feet 6 inches. Although her net tonnage is 3046 and gross tonnage 4649, she will carry 8000 tons of cargo. By a system of water ballast, after her cargo is discharged, she can take in 1000 tons in her tanks in a very short time and go to sea.

Heavy Plowshare Grinder.

This machine is especially adapted for grinding and polishing plows and other castings that are so heavy that it is necessary to handle them on a truck. It is made with a very heavy square base with sufficient spread to stand firmly on the floor and prevent vibration when being used. The arbor is made long, giving a good clearance to handle work. It has four bearings, so as to run steady without



HEAVY PLOWSHARE GRINDER.

against the accumulation of water in the cylinder condensed from the steam and to avoid the possibility of the freezing of any of the parts in extreme cold weather. Letters patent have recently been obtained for the tuyere slagging-valve device.

The new White Star freight steamships Runic and Cufic, recently put on the line between New York and Liverpool, were built strictly for the transportation of merchandise, and are navigated with such economy of fuel and low costs in other respects that they naturally come in sharp competition with rival lines. The Runic has a straight stem, iron hull, iron decks and four iron masts, with yards on the foremast. The other three masts are fitted with four stout booms apiece, fitted into goosenecks, so that when "peaked up" they can be used as derricks for loading or discharging cargo. Her engines are of the triple-expansion type, and will drive her from 12 to 13 knots an hour in fairly smooth water. She is expected to make the trip in less than 10 days. The Runic's

vibration. The weight, without wheels, is 1600 pounds; height from floor to center of spindle, 42 inches; height of base, 30 inches; length of two outside bearings, 8 inches, and are self-oiling; length of two inside bearings, 6 inches, located each side of pulleys—these are not shown in cut; diameter of spindle in bearings, 2½ inches; diameter of spindle where wheel goes on, 2 inches; distance between wheels, 60 inches; distance spindle extends beyond frame, leaving clear space, 21 inches; entire length of spindle, 71 inches; spindle pulley, 8 x 6 inches; carries two wheels any size up to 60 inches diameter; floor space of base, 34 x 34 inches; driving pulley on countershaft, 20 x 6 inches. This grinder is made by the Springfield Glue and Emery Wheel Company, of Springfield, Mass.

The Namaqua Copper Company, whose mines are at the Cape of Good Hope, have declared an interim dividend of 2/ per share, being at the rate of 20 per cent. per annum.

A New Alligator Shear.

The accompanying illustration shows a new and recently designed alligator shear which has just been put on the market by Thomas Carlin's Sons, founders and machinists, of Allegheny City, Pa. The main features in the construction of this shear are as follows: The bed is very wide

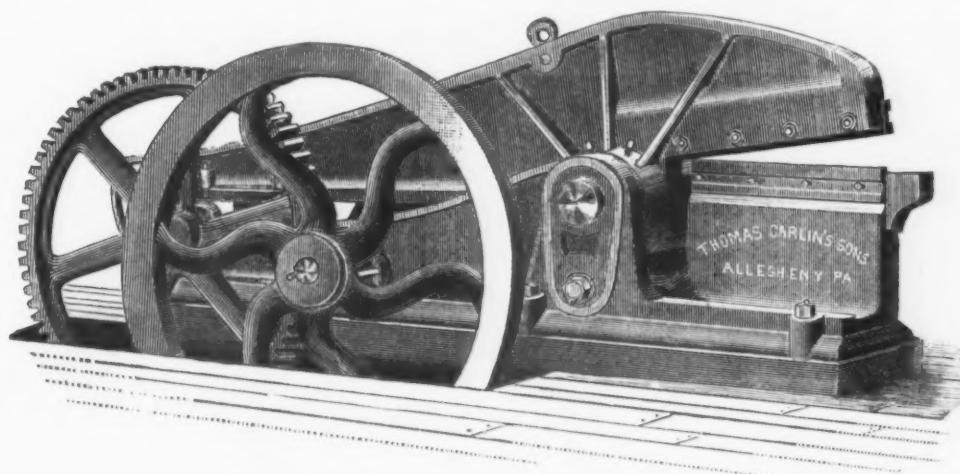
shear are steel, and their journal bearings are extra long. These shears are designed to cut $\frac{1}{2}$ -inch agricultural steel.

Gas Engine and Pump Combined.

The combination of the Otto gas engine and pump herewith illustrated is intended to avoid the difficulties frequently

order to furnish a varying quantity of water as required by hydraulic elevators. In this case the slide of the by-pass valve is acted on by a float in one of the elevator tanks, or by a piston and weight, which act when pressure in the accumulator reaches its limit.

The makers of these pumps, Schleicher, Schumm & Co., of Philadelphia, guarantee

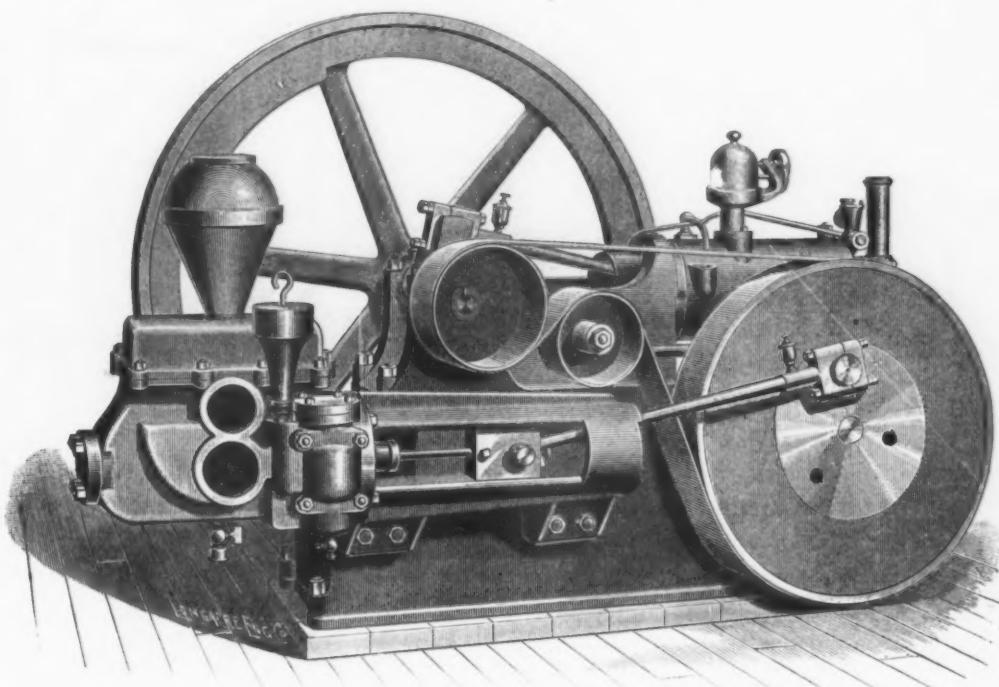


ALLIGATOR SHEAR, BUILT BY THOMAS CARLIN'S SONS, ALLEGHENY CITY, PA.

on the base, and has lugs for securing it to the foundation, a 2-inch bolt through the bed under the pin adding considerable stiffness to it. The hubs of the houses are reinforced by wrought-iron links. The knives are set well back under the lever and bed to prevent spalling off, due

met with in bringing power to pumps by means of belting or countershafts when pumps are preferably run at slow speed and with the highest efficiency. This pump is also intended to take the place of rotary or high-speed reciprocating pumps, chosen in order to save room. All danger

that they will pump more water and at less cost, with the size of engine attached to them, than other pumps when driven by the same size of engine. This enables the makers to use smaller sizes of engines to do the work for which their larger sizes have heretofore been selected in connection with



GAS ENGINE AND PUMP COMBINED, BUILT BY SCHLEICHER, SCHUMM & CO., OF PHILADELPHIA.

to the crushing strain at these points. The lever is long and is heavily ribbed for the vertical and side strains to which it is subjected, and for convenience in handling an eye has been put in it. The quick-return cam is chilled on its face, and has a steel plate dovetailed into lever for it to work against, which is cushioned, and has also a safety yoke around the cam. The gearing is heavy, is 7 to 1, and is driven by 30-inch and 8-inch tight and loose pulleys. All the shafts connected with the

of water-hammering is avoided by reason of their slow speed, and as the gears used in them are accurately cut all noise is reduced to a minimum. By means of a by-pass valve the engine can be relieved of all work. When this valve is open the water in the pump cylinder merely circulates from behind one end of the pump piston to the other, and thus admits of starting the engine without load. The by-pass is also used for stopping or starting the delivery of water in an automatic manner in

less efficient and generally high-speed pumps.

About \$1,000,000 will be expended by the Pennsylvania Railroad Company in elevating the surface railroad tracks in Jersey City.

Fargo disputes with Bismarck in North Dakota in the struggle now taking place for recognition as the permanent capital of the new State.

Sturtevant Steam Hot-Blast Apparatus.

The house of B. F. Sturtevant, Boston, Mass., has just brought out a new design of a steam hot-blast apparatus, which is now well known. This design, first placed upon the market a quarter of a century ago, has been gradually improved and rapidly introduced until now about 5500 are employed for various purposes. It combines a fan and a heater, and is usually constructed with an engine directly connected to the fan shaft, as shown in Fig. 1. The shell and wheel are of steel plate, and the shaft of steel, while all stays and braces are of angle. The engine may be directly connected to

through the horizontal pipes, and down into the space connecting with the drips. By this time it has condensed, and leaves the heater in the form of water of condensation. The sides of these heads are planed, and the joints made by copper gaskets, so that when drawn together by the through bolts there is no possibility of leakage. In connection with the sections is bolted on at one end of the group a header for steam inlet and a drip, B. Both of these are large and allow the use of exhaust steam without creating back pressure upon the engine. The pipes C D are, respectively, exhaust-steam inlet and drip communicating with the outermost section, which has no head and is entirely independent of the remainder of the group.

ordinary manufactory the distribution takes place through galvanized-iron piping, either in the form of upright mains extending to the various floors and having one or more outlets near the ceiling on each floor, or in other cases horizontal mains extend the entire length of the building just under the ceiling on each floor and the air is discharged through outlet in these. In schools, churches, &c., the air is generally conveyed through flues built into the interior walls, the volume and rate of discharge being governed by the register through which the air escapes. The object is always to discharge the air either at or toward the cold outer wall; but in this, experience is necessary in order to enable one to lay out

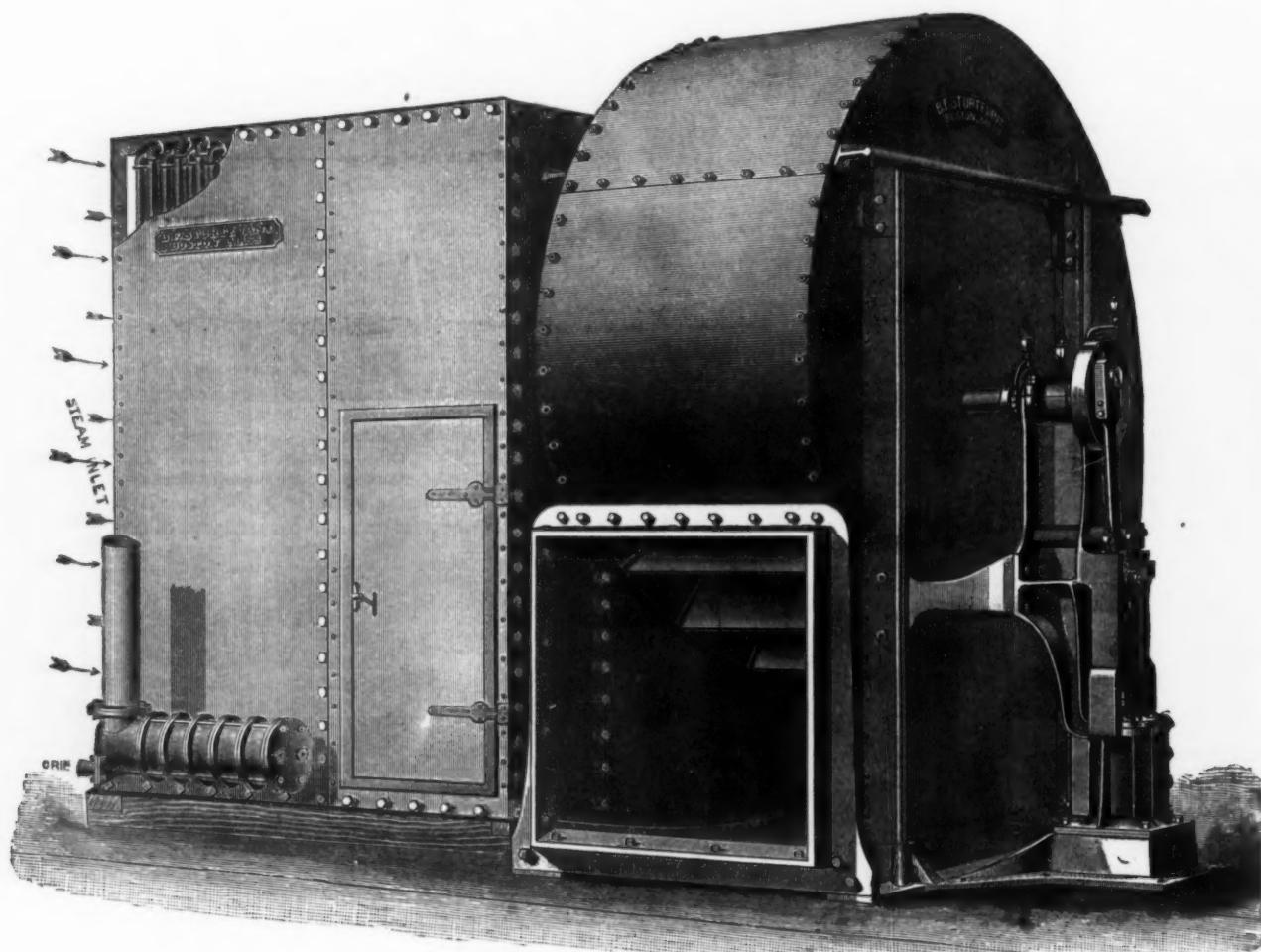


Fig. 1.

STURTEVANT STEAM HOT-BLAST APPARATUS FOR HEATING AND VENTILATING.

the fan shaft, or it may be independent and arranged to drive the fan by belt and pulley. The advantage of a special engine for the sole purpose of driving the fan is evident. The fan may then be run at any time and speed, independent of any other source of power. Radical changes have been made in the heater, which forms a very important factor in the combination. As now constructed, the heater proper consists of a series of hollow sectional bases, shown clearly in Figs. 2 and 3. Their sides are corrugated so as to fit closely together and allow of no alternate expansion and contraction of the air passing between the pipes. At one end of each section is a circular head, Fig. 2, divided horizontally by a diaphragm, so that the upper portion is in communication with the steam inlet and the lower with the drip. Steam admitted at the left through the steam inlet passes up the series of pipes,

It is designed to utilize the exhaust from the fan engine. The head end of each section rests upon the wrought-iron foundation of the heater, while the opposite ends are supported by cast-iron balls, so as to allow for expansion. After continued use of wrought-iron pipe the maker of this apparatus adopted steel pipe as better adapted for use in his heaters, and has it made especially for him of standard weight per foot. The heater is incased in a fire-proof steel-plate jacket, communicating with the inlet to the fan, so that air is drawn by the fan equally across all parts of the heater, and, as the pipes in the sections are set staggering, the air is compelled to take a tortuous course and is brought into intimate contact with every foot of pipe. In operation for heating and ventilating, the outlet of the fan is constructed with a system of ducts or pipes leading to the various parts of the building. In the case of an

a perfect working system. This, the blower system, is positive in its action; the air being forced into the building must of necessity thoroughly circulate through it. As the source of supply of the air introduced is under control, there can be no opportunity for the presence of injurious impurities. Changes in the weather produce no injurious effect upon the system, since the pressure produced by the fan is far in excess of that due to changes in the atmosphere. The large amount of air passing through the heater causes a rapid condensation of steam, and each square foot condenses from three to five times as much steam as would be condensed by the same area in an ordinary coil radiator. In other words, it is claimed that only one-third to one-fifth of the pipe is required to do the same amount of heating. All the pipe is combined in a single heater, and all valves are within easy reach, placing the entire control of the apparatus in the hands of a

single individual. In addition, it is claimed that a more rapid change in the temperature of the building is possible with this system than with any other, either direct or indirect. This method is now in use in some of the largest manufactoryes in the country.

Industries of Lansing, Mich.

A Western daily publishes the following interesting information relative to the manufacturing interests of Lansing, Mich., which have been developed almost wholly within the past four years: Among the prominent manufactoryes of Lansing, foremost mention must be made of the Lansing Iron and Engine Works, which were established in January, 1885. The company succeeded the copartnership of Jarvis, Barnes & Co., and since their incorporation with a capital of \$100,000,

the facilities. This factory was only established three years since. A business is being done of \$200,000 a year. James J. Baird is president; Orlando F. Barnes, vice-president, and Frank E. Briggs, secretary and treasurer.

The Lansing Wagon Company, with a capital of \$100,000, turn out over 3000 wagons a year, and are reputed to manufacture as fine a wagon as any in the country. Farm, lumber and freight wagons are made and the works are taxed to their utmost capacity. The Capital Wagon Company also boast of many new and important inventions, and claim for their manufactured goods by comparison a high position and an undoubted superiority. Anderson & Bush's manufactory has a capacity of 3000 road carts a year. The business was established last July. Orders for their goods come chiefly from the East, but their trade reaches Kansas and Nebraska. They manufactured goods last

that kegs of 200 pounds average 15 more spikes. This spike is rolled complete at a single heat through Fowler's patent spike rolls, forming the head without bending or upsetting the metal or breaking its fiber. This is accomplished by rolling down the shank of the spike from a bar of peculiar shape and larger in cross sections than the head of the spike itself. The method of manufacture, the machinery employed and the spike itself are covered by six distinct patents.

Edison Exhibit at Paris.

The Edison exhibit at the Paris Exposition will, according to the New York *Tribune*, occupy nearly one-third of the entire space allowed the United States. The display of phonographs will include the original instrument now in the South Kensington Museum, London, together with those showing the latest improvements. The telegraph department will contain models of all the machines Mr. Edison has worked out. In the telephone division there will be a chronological arrangement of all the devices from the original "Blake transmitter" down to the latest loud-speaking telephone. In electric lighting there will be a complete three-wire municipal system extending over all the exhibit. The principal feature of the exhibit will be an enormous model of an incandescent lamp, 40 feet high, the globe being composed of no less than 20,000 incandescent lamp bulbs, and the carbon filament within being indicated by a loop of red-colored incandescent lamps. The effect when the light is flashed into these thousands of bulbs will be wonderfully brilliant. Around the base of this novel lamp will be a series of panels illustrative of the various stages of the manufacture of in-

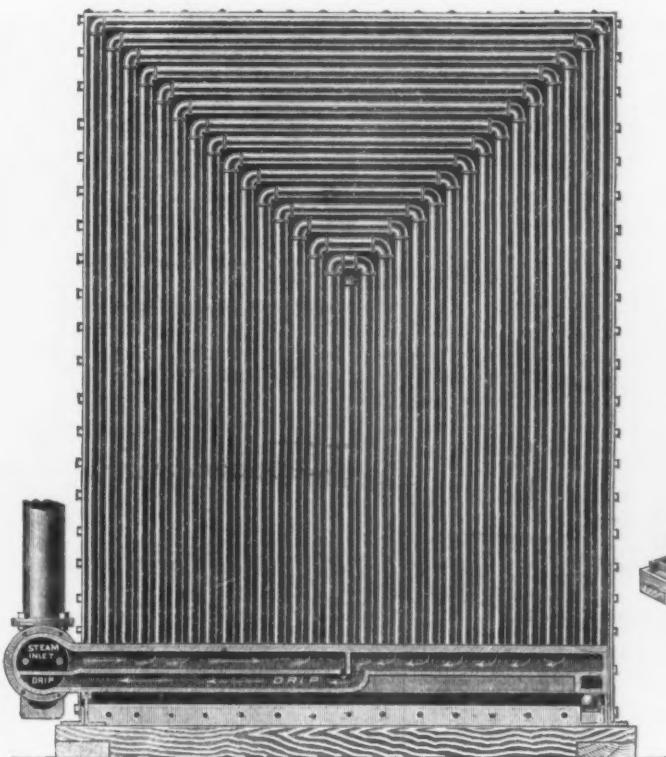


Fig. 2.—Heater for Sturtevant Hot-Blast Apparatus.

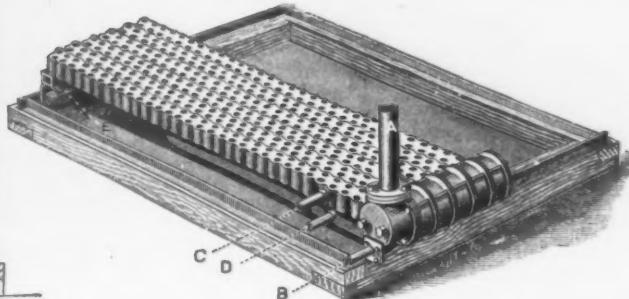


Fig. 3.—Detail of Heater.

the expansion of the industry has been so marked that its volume of business reaches \$350,000 a year. The character of the engines manufactured by the company is shown by their increasing business, and they have in connection one of the largest boiler shops in the State. They also manufacture compressed air-cylinder derricks for handling heavy machinery and mill, railroad and mine supplies.

Next in importance may be mentioned the Lansing Wheel Company. Michigan can boast of only one carriage-wheel manufactory, and that is operated by the Lansing Wheel Company. In this factory 30,000 sets of wheels are made in a year, and employment is given to a large number of men. The making of carriage-wheels to-day is very different to what it was in the days of old. The rapidity with which all the work is done is remarkable. It takes the spoke driver about 15 minutes to place the spokes in a set of wheels, the machine working on the wheel is done in half that time, the rimmer does his work on a set in 10 minutes, and the set is finished in 40 minutes. The works are so constructed that they can turn out 150 sets a day, and it is the intention to increase

year to the amount of \$75,000, and are now about to build and increase their facilities.

The blast furnace men propose at the next convention of the Amalgamated Association of Iron and Steel Workers to make an effort to be admitted by that organization, if possible. The furnace-workers are now paid by the day, but they believe that in the major part of their work they should be paid by the ton, as their work requires fully as much skill as to puddle iron. Should they be admitted, fully 9000 additional members will be gained by the Amalgamated Association.

The Fowler Rolling Mill Company, 185 Dearborn street, Chicago, are putting a railroad spike of improved shape on the market. The spike has a sharp chisel point, and its shaft is trapezoidal in cross section. This form, it is claimed, presents greater resistance to the thrust of the rail than other spikes, while the sharp point tears the fiber of the tie less. Its weight is less than that of the standard spike, as there is no waste metal in its formation, so

incandescent lamps, and on either side will be the French and American flags worked out in colored incandescent globes. One will be inscribed "Paris," and the other "Edison." Among other novelties will be a huge dynamo capable of running 2000 lamps, one of the largest dynamos that has ever been constructed. An interesting feature will be a series of charts, 100 in number, showing the growth and development of all Mr. Edison's inventions from the first crude idea, through all the successive stages, to the complete and perfected instrument. There will be a number of frames showing the filaments in their natural condition, and after being carbonized, with samples arranged in chronological order, of all the substances that have been experimented with in this direction.

An interesting map of the first electric central station and district in New York will also be exhibited, with a tabular statement showing the growth of the business from a net loss of \$4457 in 1883 to a net profit of \$116,235 in 1888, and this despite the reduction of gas to \$1.25 per 1000 feet, while the equivalent cost of electric light is \$2.25.

The Pierce Air-Valve.

Both the accompanying cuts are full size, Fig. 1 showing the valve provided with dip attachment, Fig. 2 being without the dip. The valve is both automatic and positive. With this combination the positive valve can be opened to heat up the radiation at once, without waiting for the air to be forced out through the automatic. To increase the durability and prevent corrosion all metal parts of the valve are nickel-plated both inside and out. The expansion and contraction of the hard rubber body, responding quickly to heat

\$62,500, the proceeds of the sale of which were to form the working capital of the company. The complainants' interest consists of the purchase of \$5000 each of this stock, and 1625 shares of the stock in all were sold, realizing about \$100,000. George M. Pullman purchased all of Mr. Doane's stock—about 1000 shares—although the stock has never been transferred to him on the books. Extensive works were erected at Pullman for the manufacture of spikes, and a rolling mill was also built at Mr. Pullman's suggestion, it is claimed, increasing the cost of the plant about \$20,000. The

company has been to furnish iron and iron-work for the Pullman Palace Car Company and for their especial benefit, the latter company dictating prices below that of the market. The liabilities of the Pullman Iron and Steel Company are stated to amount to \$302,256.07, while the total assets are \$279,618.19, the greater portion of which are in the plant, which cost \$190,046.54. Of the indebtedness \$180,000 is to the Pullman Palace Car Company. The railway spike patent is claimed to be worthless and to have been practically abandoned. The court is asked, therefore, to order the property sold by the receiver, to direct an accounting to be taken, and that the proceeds may be divided pro rata among the stockholders according to their interest.

The filing of this bill will hardly affect the credit of the company, as long as it is understood that the Pullman Palace Car Company are interested in keeping the works in operation, but the experience of these outside stockholders is very instructive to others who are inclined to invest in auxiliary corporations operating in connection with large consumers of their products.

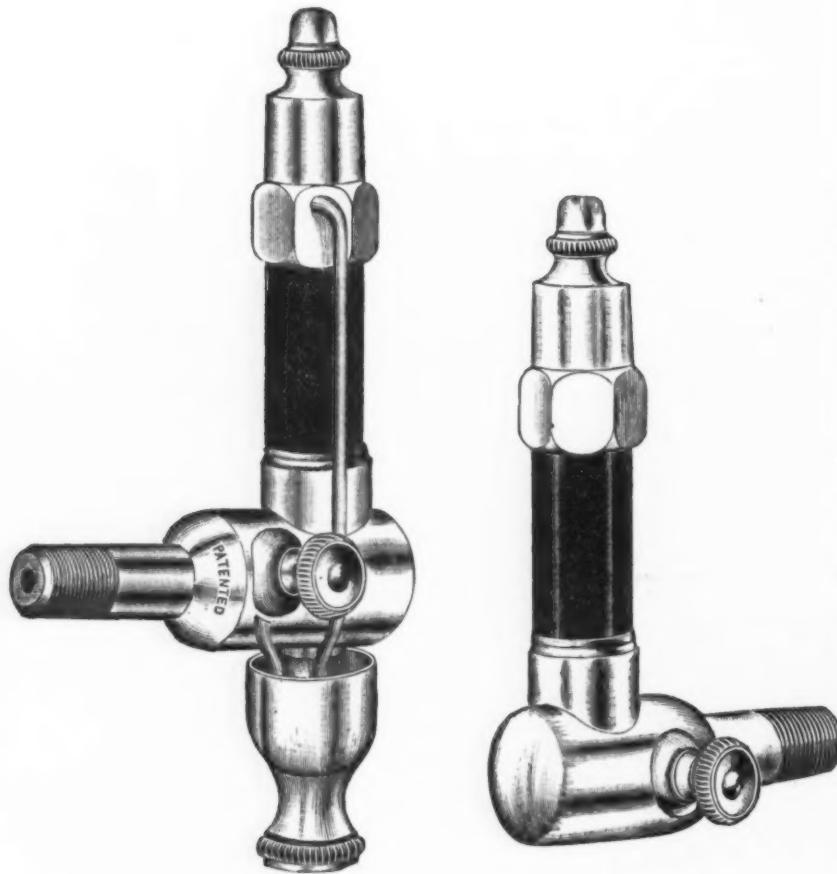


Fig. 1.

Fig. 2.

THE PIERCE AIR-VALVE.

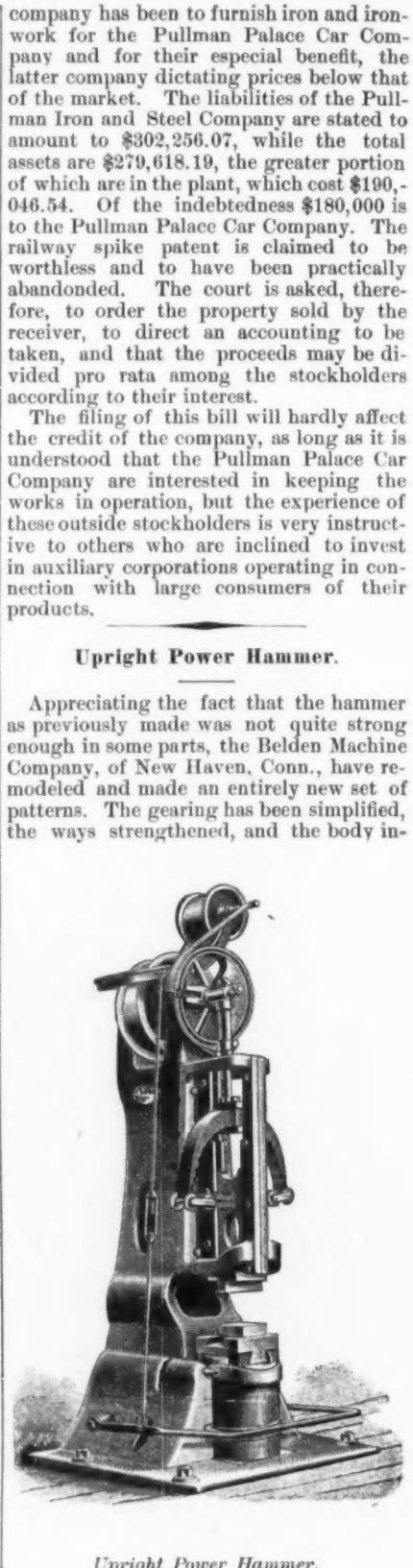
and cold, render the automatic part reliable, while the positive is available whenever required. This valve is made by the Pierce, Butler & Pierce Mfg. Company, of Syracuse, N. Y.

The Pullman Iron and Steel Company.

Some interesting information has been given to the public relative to the Pullman Iron and Steel Company, operating a rolling mill at Pullman, near Chicago. This information comes through the filing of a bill on the 4th inst., by Francis T. Wheeler and Lucius G. Fisher, asking for the appointment of a receiver for the company. The complainants own \$5000 of stock each in the company. They say that October 8, 1883, Frank B. Felt and James P. Perkins were owners of one-half a patent on railway spikes, the other half being owned by George M. Pullman and John W. Doane, Mr. Pullman's interest, however, being in the name of James H. Smith, his private secretary. A corporation was formed with a capital of \$500,000. The four stockholders contributed equal amounts out of their stock aggregating

works were completed in the spring of 1884, and have been run, the complainants say, ever since, at a loss to the company. The spike manufacture was almost entirely abandoned as a failure, and the principal business of the company has been the manufacture of bar iron. The works and machinery were found to have cost more than the working capital, which was about \$116,000, and in July, 1884, the company mortgaged their property to secure an issue of \$100,000 of bonds. Of this issue \$25,000 worth of bonds were sold at par. The company still losing money, they borrowed at various times from the Pullman Loan and Savings Bank, of which George M. Pullman is president and controlling officer, sums of money aggregating \$56,000, for which the bank holds the \$75,000 of unsold bonds as security.

The Pullman Palace Car Company, according to the bill, in 1885 extended credit to the Pullman Iron and Steel Company by which the latter were enabled to purchase materials and continue in operation up to the present time. The complainants charge, however, that through the control of Mr. Pullman as principal stockholder almost the entire business of the iron and steel

*Upright Power Hammer.*

increased in every place where there was a possibility of its being weak. The manufacturers now claim that this hammer can be run at a higher rate of speed and with less jar or liability of breaking, as there are no valves, rods or cylinders, than any other. As every part is plain and simple, the repairs are trifling. It is further claimed that it requires less power and occupies but little space. The dies are never on the work when the hammer is still. The anvil block is made separate, and if broken can be replaced at a small cost. Stock varying from $\frac{1}{2}$ inch to 3 inches can be worked without trouble. The changes made in this hammer were made only after a use extending over several years in the works of the manufacturers.

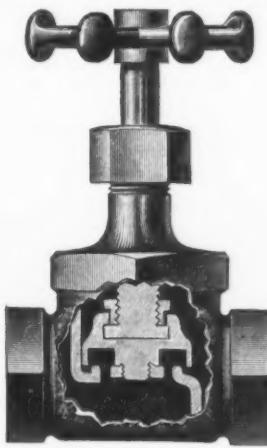
The Frisbie Valve and Union.

The cylinder valve here illustrated is so designed as to do away with the necessity of disconnecting the valve from the pipe in case the seat becomes worn. This is accomplished by making the disk independent of the stem, but held in position by a cast shoulder. The face of the disk is concave and filled with packing, which is prevented from spreading by the metal walls on the disk. The advantages claimed are that in case of wear the disk may be re-

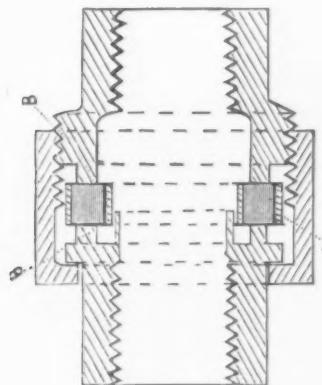
active when industry is paralyzed; the ordinary payments in legitimate business or in settlements with labor. Obviously these classifications comprise elements too uncertain and intangible to serve as a basis for definite conclusions. Returns of skilled labor employed, prepared at regular intervals, as in England, are of some value as an index of the business situation, and in the United States we have at command, in the statistics of the Labor Bureau, if promptly published, a source of information that should be availed of to

so, after removing a few times, it is unfit for further use and has to be renewed. At the same time this is generally the leaky part of the boiler, and is a continual eye-sore to a skilled mechanic.

With the common use of steel in boiler-making many changes have been made possible and one of the most decided improvements is the form of man-hole opening called Eclipse man-head, which is illustrated herewith. This opening is flanged by a machine especially made for the purpose, the same as if it



THE FRISBIE VALVE.



THE FRISBIE UNION.

moved by unscrewing the nut of the valve, when the concave part can be refilled and placed in position in a short time.

THE FRISBIE UNION.

In the union illustrated the gasket A is held between two metal rings, B B, the space between which is filled with any suitable packing, which is held firmly in position by the rings. These gaskets are furnished the trade in all sizes and filled with asbestos, babbitt or rubber by the

fullest extent. Reports of this character reflecting the condition of a wide range of industries would become invaluable.

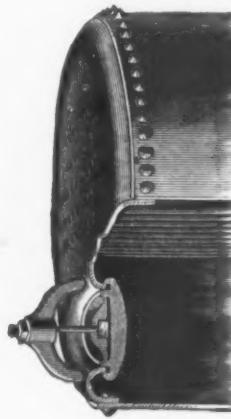
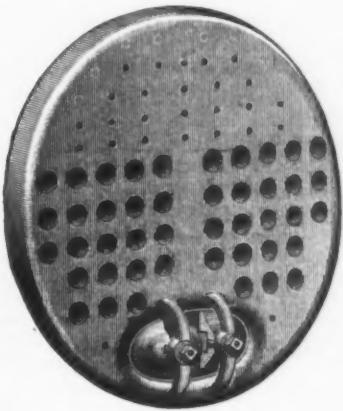
The Eclipse Man-Head.

For the purpose of securing entrance to tubular or flue boilers it is the custom to cut a hole in the shell or head large enough to admit a man's body. This

were a flue-hole. The uneven surface is planed level. The man-head plate has a recess or channel, in which molten lead is run, forming a gasket, and prevents it spreading or thinning out under pressure. The bolts and crabs are the same as in the old form. Therefore it will be seen that the flanged and planed opening presents a perfectly level, hard surface against the perfectly level, soft surface of the lead, so there is no chance of a leak and no unequal strain on the boiler, gasket or plate.

Where a boiler was weakest in the old form it is now the strongest, without an increase in weight. Briefly, the advantages gained are strength, improved appearance of the boiler, freedom from leaks, economy in the use of gaskets and ease of entrance to the boiler. It has now been in practical use for over a year in many sections of the country with unqualified success.

The Eclipse man-head and the machines for making it are patented by R. Munroe, of Pittsburgh, a practical boiler-maker of 50 years' practice. Consumers or boiler-makers can obtain this improvement and all information regarding the same by addressing Mr. Munroe, as above, or Joseph T. Ryerson & Son, at Chicago, the sole licensees for Chicago and the West.



THE ECLIPSE MAN-HEAD.

makers of both the union and valve, the Barnett Brass Company, of Mansfield, Ohio.

An improved business barometer is one of the wants of the times. Bank clearings, railroad earnings and even reports of tonnage by the main lines of transportation are all misleading as indications of the volume of current business. Bank exchanges are deceptive, because they report indiscriminately in one aggregate three kinds of transactions, viz., payments on purchases made at any previous time, but especially the settlements on maturing commercial paper, of various dates; purely speculative operations, which are often

hole is oval, and around it is riveted a wrought or cast iron ring of the same internal diameter as the opening. In service this opening is closed from the inside by a cast-iron plate called "man-head plate," which is held in place by bolts and crabs. To secure a steam-tight joint a gasket of rubber, asbestos, lead or other yielding substance is placed between the boiler-head or shell and the man-head plate. In practice it has been found difficult to secure a perfectly flat or even surface, so that it has been necessary to draw the man-head plate tight against the boiler that the gasket might be forced into all the uneven surfaces. This gasket, therefore, is often forced out of shape;

In the French Chamber of Deputies M. Villain moved an order of the day appealing to the Government to safeguard the interests of the shareholders of the Panama Canal. M. Rouvier, Minister of Finance, disclaimed any responsibility on the part of the Government. He said the Government had no means of interfering, although it approved of every effort made by capitalists and companies to prevent the collapse of the undertaking. Prime Minister Tirard, replying to M. de Cassagnac, said the Government would do its utmost for the success of the canal, but he could say no more. The chamber, then, by a vote of 344 to 185, adopted a Government order of the day in regard to the canal. The Court of Appeals decided that the Panama Canal Company is a civil association, thus reversing the decision of the Tribunal of Commerce that the company was a commercial society.

THE WEEK.

It is remarked that the Interstate Commerce law, which provides for the regulation of railway traffic between the States by federal law, has come to stay, and becomes ingrafted upon the established policy of the United States. Congress has shown no disposition to recede from the high ground originally taken, and President Harrison in his inaugural address affords no encouragement to corporations that may have hoped to evade or practically nullify the laws holding them to due accountability and restraint.

The latest Havana advices report a probable decrease this year in the Cuban sugar crop equal to 40 per cent., equivalent to about 200,000 tons compared with the previous crop.

The scheme for a bridge to Long Island, crossing the East River at Blackwell's Island, has encountered an adverse decision in the Supreme Court, Judge Van Brunt having refused an application for the appointment of commissioners to acquire land. He upheld the argument of Assistant Corporation Counsel Twombly, in opposing the application, that the act of 1885 gave authority to a private company to lay railway tracks over the bridge in violation of the provision of the Constitution of the State.

Plans for the improvement of wharf facilities on the North River front were brought to the attention of the New York Chamber of Commerce at its last meeting by President Post, of the Department of Docks. As a large expenditure of money is involved, the approval of the chamber was desired. Some years ago the present engineer in chief of the department suggested a change in the original "new plan" so that the North River front, between Eleventh and Twenty-third streets, might be utilized, and the commercial possibilities of the North River increased some 25 per cent. The change contemplates the extension of West street, with a width of 250 feet in a straight line from West Tenth to West Twenty-third street. Excepting the blocks upon which the West Washington Market is erected and the excavation of the land to the west of the street, the property for this improvement should be purchased by the city. This improvement gave 25 per cent. more wharf room and seemed to be the only way by which the city could be rapidly prepared for its increasing commerce. If it were adopted 19 large piers, 2 half piers, and 2 small piers could be built which would yield to the city a revenue of \$800,000 a year. Its total cost would be about \$8,861,000. Deducting the yearly taxes now received by the city on the property to be purchased, amounting to \$63,000, the net income to the city would be \$737,000, or over 8½ per cent. on the investment, without taking into consideration the increased amount of business which would accrue to the benefit of the city. The subject was referred to the Committee on Harbor and Shipping.

Canadian trade is reported to be suffering for want of a foreign market. All the industries are affected. Trade with Australia is without profit, the costs of transportation being too large. The most promising markets are South America and the West Indies.

Sidney Dillon and other capitalists in New York and Pennsylvania are about to lay pipes in Philadelphia for steam-heating purposes, a location for the central plant having been already purchased.

A falling off in the tide of immigration is noticed at Castle Garden. The arrivals during the last six months number 107,680, a decrease of 21,500 compared with the same months last year. A better class of

immigrants are coming than formerly, as for 10 governments have learned that we will not receive ex-convicts and paupers.

The present debt of Canada, as shown by the Minister of Finance, is \$236,000,000, an increase of 120 per cent. in 14 years; but the customs tariff now in force is expected to yield a surplus. While trade with the United States largely increased last year, that with Great Britain shows a marked decline.

An official report of the results of the horse-car strike in this city as affecting the men engaged in it shows that not less than 2783 men lost their positions, entailing severe hardship. Master Workman Magee, who acted a prominent part, affirms that it is the purpose of the railroad managers to drive out of the business all who were identified with the Knights of Labor; that on some roads none of the old men are restored.

The January exports from San Francisco were the largest for the same month in the history of the city, with a single exception. The total valuation was \$3,791,674, of which \$2,611,354 were to Europe and \$1,180,326 to Pacific ports. Among the latter the Hawaiian Islands lead with \$296,000. China, Mexico, Australia and Central America are next, in the order named. Mexico is doing better than before for a long time, while Australia is falling off.

The leading cities and towns of the new State of Washington are Tacoma, Seattle, Spokane Falls, Ellensburg, North Yakima, Port Townsend and Whatcom, all entering upon a prosperous career. The *West Coast Trade*, a weekly paper just started in Tacoma, holds that "Tacoma possesses by right of situation unusual advantages as a jobbing center. Located at the head of ocean navigation, in the midst of a rich and fertile a country as the sun shines upon, it is evident that kind nature intended the 'City of Destiny' to become a supply point, not only for Washington Territory, but eastern Oregon, Idaho and Alaska. There are other corroborative arguments to this claim. Tacoma is the terminus of the greatest transcontinental railroad in the United States; the terminus of the Japan and China trade; the terminus of the steamship lines to Alaska, and terminus of various lines of boats plying the waters of the sound. Last fall the East was startled by the fact that the surplus wheat of the great inland empire could be shipped through the port of Tacoma and sold in Liverpool in competition with wheat grown on the Atlantic. Our hops command the highest market price in Liverpool. The Nicaragua Canal will be completed some time, and then Tacoma will be 8000 miles nearer New York and 6000 miles nearer Liverpool than she is to-day, and her position as a jobbing point will be second to none in the country."

A. J. Drexel has determined to establish "The Drexel Industrial College for Women," at Wayne, Delaware County, Pa. The entire expense of the institution, including endowment, will reach, it is said, \$1,500,000.

Our seacoast defenses for the better protection of harbors are the subject of earnest inquiry by the Army Board on Ordnance and Fortifications, and the board is now convened at the War Department to further consider the plans of designing engineers. In accordance with the act of Congress, the Watervliet Arsenal, at Troy, N. Y., is now being rapidly converted into an army ordnance gun foundry, at which place the heavy guns for the seacoast defense will be put together. The forgings for this large caliber of ordnance have been contracted for. Reports have been received from Lieut. W. Crozier, of the Ordnance Corps, who was sent abroad about

three months ago especially instructed to make a specialty of gun carriages, and from Lieut. F. E. Hobbs, whose efforts were to be confined to the latest improved method of producing steel. A large order for munitions of war was received at the Allegheny Arsenal on Saturday.

All traffic on the Columbia River and Puget Sound, so far as the Oregon Navigation and Railway Company are concerned, has been wholly suspended, officers and men refusing to work at the proposed 10 per cent. reduction.

The endurance of the steam-engine is well illustrated in the case of the White Star steamship Germanic, which has made 280 trips across the Atlantic and steamed nearly 1,000,000 miles. On a recent trip she arrived at Queenstown in 7 days 9 hours and 27 minutes from Sandy Hook, or five hours less than her best previous voyage.

It is again reported that the Oceanic steamship line from San Francisco to Australia will withdraw from service at the end of October, as the North German Lloyd Company, heavily subsidized, are arranging to secure it. Some years ago Wm. H. Webb, of this city, maintained a line to Australia for a considerable length of time, but was compelled to abandon the enterprise for lack of substantial encouragement.

Secretary Tracy has appointed Frank A. Dennette mechanical superintendent of the gun foundry in Washington city. This position has remained vacant for some time, owing to the inability of the Navy Department to procure a competent man for the place. Mr. Dennette has been in the employ of the Bethlehem Steel Works for some time and lately with the South Boston Iron Works.

Justice Cullen, of the Brooklyn Supreme Court, decides, in the case of Mr. Higgins, soap manufacturer, that the certificate of inspection from the insurance company does not exempt owners of boilers from inspection by the constituted authorities.

Legislative delegates from nearly all the cattle-growing States are holding a convention in St. Louis to defeat the alleged beef and pork combination.

By the will of J. V. Williamson, admitted to probate on Monday, another \$1,000,000 is given to the charitable institutions of Philadelphia, including nearly all the old well-established hospitals and homes and some libraries, educational institutions and miscellaneous charities. Noticeable among the gifts of special importance are \$25,000 to the Apprentices' Library and \$20,000 each to the Academy of Natural Sciences and the Academy of the Fine Arts. The crowning act of Mr. Williamson's philanthropic life was the gift of \$2,500,000 for the founding of the Williamson Free School of Mechanical Trades, which is to be built as soon as a location is decided upon. The affairs of the project are now in the hands of a board of trustees selected by Mr. Williamson. The estate of Mr. Williamson will amount to between \$8,000,000 and \$9,000,000, exclusive of the fund for the mechanical school.

Prospects for the completion of the Hudson River Tunnel to connect the railroads terminating in New Jersey with this city have suddenly become brighter. Colonel Haskin, the indefatigable projector, ceased operations only when funds became exhausted. Quite recently an effort to raise money was attempted in London. The London *Financial News* says that the applications for the issue of \$1,500,000 first mortgage 6 per cent. bonds of the Hudson Tunnel Railway Company have exceeded \$2,500,000.

MANUFACTURING

Iron and Steel.

A press dispatch from Pottsville, Pa., under date of the 5th inst., says: "The employees of the Fishbach rolling mill of the Pottsville Iron and Steel Company, which has been idle for several weeks on account of a reduction of wages, held a meeting in this city to-day to consider a compromise proposition offered by the company. A reduction of 10 per cent. for the tonnagemen was agreed to, with the understanding that as soon as an improvement in the market warrants it the men shall have the benefit of the advance. On the day-men it was agreed that there should be a partial reduction confined to those receiving the higher rate of wages. The agreement has been ratified by both sides, and the mill will start up in all departments tomorrow morning, the entire force of some 800 employees resuming work."

The new Soho Furnace of the Moorhead McCleane Company, at Pittsburgh, produced 5550 gross tons of pig iron last month.

Mr. S. R. Smythe, secretary of Swindell Construction Company, Lewis Block, Pittsburgh, Pa., engineers and contractors of regenerative gas furnaces, &c., informs us that his company have changed the name of their firm to the Swindell & Smythe Company, as there are several construction companies, in the same and other businesses, which conflict somewhat with theirs. They will continue to carry on the same business. All the members connected with the Swindell Construction Company will still continue to hold the same interest in the newly-named firm as before.

No. 1 furnace of the Isabella Furnace Company, at Etna, Pa., for the week ending February 16, produced 1812 gross tons of pig iron, and for the following week produced 1810 gross tons. For the month of February just closed both stacks produced 11,974 gross tons. This is certainly an enviable record.

The Scottdale Iron and Steel Company, Limited, of Scottdale, Pa., will soon commence the erection of an additional sheet mill.

Carnegie, Phipps, & Co., Limited, of Pittsburgh, operating the Beaver Falls Mills, at Beaver Falls, Pa., are making some extensive improvements and additions to the plant. An order for 50 wire-nail machines has recently been placed with the National Machinery Company, of Tiffin, Ohio, which will be placed in the works at an early date.

A dispatch from Findlay, Ohio, under date of the 8th inst., reads as follows: "The Findlay Iron and Steel Company to-day passed into the hands of a receiver, owing to financial complications contracted before the removal of the plant from Cincinnati. The liabilities are said to be \$30,000. C. H. Emerson was made receiver."

The Stewart Iron Company, Limited, of Sharon, Pa., are operating Nos. 1 and 2 blast furnaces and 13 puddling furnaces to their full capacity.

The nail factory of the Kelly Nail and Iron Company, at Ironton, Ohio, which has been idle for some weeks, has resumed operations in full again.

It is expected that the present week the entire new plant of the Allegheny Bessemer Steel Company, at Duquesne, Pa., will be in operation. The blooming mill has been in operation for several weeks, and a large supply of blooms being secured, it has been decided to start up the rail department. It is understood

that the company have booked some large orders for rails, sufficient to run the plant full time for some months to come. H. P. Smith, the secretary of the company, who has been in the South since November last, for the benefit of his health, is reported greatly improved and will probably return to Pittsburgh some time during the early part of April next.

During the month of February just closed the blast furnace of the Bellaire Nail Works, at Bellaire, Ohio, produced 4559 gross tons of Bessemer pig iron, or an average of about 163 tons per day.

For the month of February the blast furnace of the Belmont Nail Company, at Wheeling, W. Va., produced 3200 gross tons of Bessemer pig iron.

The nail factory of the Junction Iron Company, at Mingo Junction, Ohio, closed down on Saturday, the 2d inst., for an indefinite period.

A despatch from Youngstown, Ohio, under date of the 7th inst., says: "James Friend and Andrien Hoffstot, of Pittsburgh, with Lloyd Booth and Ralph J. Wick, of this city, have purchased the rolling mill of the Wheeler Iron Company at West Middlesex, which has been idle for the past two years. The price paid was \$8625. The plant cost \$135,000, and most of the machinery is in excellent condition. The purchasers have not decided whether they will operate the plant or dispose of it to other interests."

A boiler in the forging department of the Cleveland Rolling Mills, at Cleveland, Ohio, exploded on Monday morning.

A dispatch from Atlanta, Ga., announces that the Cartersville Furnace Company, the Etowah Company and the Daisy Coal Company now constitute one corporation, under the name of the Etowah Land and Mining Company, with a capital stock of \$1,750,000, with the privilege of increasing it to \$5,000,000. The work will proceed through trustees until the charter is granted. The work on the furnace has been suspended pending negotiations, and the general plan will now be greatly enlarged, and as soon as the new plans have been fully agreed upon the work will be rapidly pushed to completion.

Machinery.

McGill, Manchester & Co., Limited, founders and machinists, of Pittsburgh, recently shipped to the Allegheny Bessemer Steel Company, at Duquesne, Pa., a hot bed consisting of tables and hot and cold pull-ups, weighing about 130,000 pounds. This firm are now building eight hydraulic cranes for the new steel works, at Latrobe, Pa.

Lodge, Davis & Co., of Cincinnati, are now installed in their new quarters at Lake and Canal streets, Chicago, where they have established a branch for the exhibition and sale of their lathes, planers, shapers, milling machines, &c. They make a specialty of engine lathes, with taper attachment, hollow spindle, compound rest, automatic stop to carriage and other attachments, all without extra charge. A feature of their stock is their upright drill press, with patent automatic stop to the down feed, patent quick return, &c. All tools are sold f.o.b. Chicago.

At the works of Schleischer, Schumm & Co., of Philadelphia, manufacturers of the Otto gas engines, we recently saw a twin engine which had furnished power for the entire shop for more than eight years, and which during that time had never refused service, and had cost less than \$10 yearly for repairs. A 50 horse-power gas engine of improved design will soon be placed on the market. Recent sales include two 50 horse-power engines to the Raleigh Gas

Light Company, and one of 50 horse-power to the Derby Gas Company, of Birmingham, Conn., and the Atlantic City Gas and Water Company.

The Stillwell & Bierce Mfg. Company, of Dayton, Ohio, have just engaged in the manufacture and sale of mining machinery and appliances, and for this purpose have associated with them Mr. W. H. H. Bowers, a mining engineer and metallurgist. The company will make leading specialties of his patented inventions.

Pedrick & Ayer, of Philadelphia, builders of machine tools, have completed plans for a new brick building having a frontage of 40 feet and a depth of 160 feet and two stories high. Upon the first floor will be placed the heavy machinery employed in the manufacture of their large universal milling machines. The iron posts of this story will be provided with powerful cranes, and overhead will be lines of track arranged so as to conveniently handle the work. The engine and boiler room, in the basement at one end of the building, will be covered with brick arching on iron beams. Above this will be the forge-room and a large steam hammer built on a special foundation. On the second floor will be the offices, drafting-rooms, pattern-shop, &c. Each department will be well lighted by an excellent arrangement of skylights.

The firm of Goodell & Waters, of Philadelphia, have in press a large and fully illustrated catalogue showing the improvements they have made in their wood-working machinery. This book—judging by the last issue, will be far in advance of the usual catalogue style—will contain illustrations of all their most important machines, together with clear descriptions of their merits.

Hardware.

The new barbed-wire department of the Cleveland Rolling Mill Company, at Cleveland, Ohio, has commenced operations with a fair amount of orders on hand.

On Wednesday, the 6th inst., notices were posted in the plant of the Wheeling Hinge Company, at Wheeling, W. Va., notifying the employees of a 10 per cent. reduction. The men refused to accept it and the works closed down. The company will attempt to operate the works with new hands, and expect to have no trouble to secure a full complement of men.

S. L. Bignall Hardware Company, 233 Lake street, Chicago, Ill., are giving their attention principally to sad irons, sinks, soil-pipe and fittings, but manufacture also pitcher spout pumps, sinks, blacksmiths' tuyere irons, tire drills, barn-door hangers, jack screws, &c.

Last week the Enterprise Mfg. Company reported 12 hands in the foundry; to-day they are running 21 and have others engaged, and expect in a very short time to report that they have all the molders they need. The former employees are trying their best to prevent new men from working, and to some extent have succeeded, but the company say that no matter how long it takes or what the cost may be they intend to have an independent shop, and not be dictated to by any more grievance committees.

The striking employees of the Ames Shovel Works, in North Easton, Mass., have been notified to vacate the corporation tenements by March 21. None of the men will return unless all are taken back, and Mr. Ames says some of them he will not reinstate. The strike is likely to affect other departments.—*Philadelphia Ledger.*

The Iron Age

New York, Thursday, March 14, 1889.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Copper Situation.

The newspapers have devoted an unusual amount of attention lately to the metal trade, and have generally been hostile to the syndicate. This has probably been due to the fact that information and comment had come chiefly from disappointed metal brokers, and that the greater number of writers have been able to refer to past predictions with a triumphant "I told you so." From the point of view of the French speculators the situation is certainly very serious. It has become a question not of ultimate success, but of saving as much as possible from the wreck. There is every evidence that heroic efforts are being made to avert a complete panic, which would hurt far greater interests than those which appear on the surface.

Dealing first with the course of events on this side, we may state that in October last the syndicate made overtures to the American companies to extend the existing contracts for 12 years, making, with the two years of the existing unexpired contracts, 14 years. This extension was sought by the speculators, as it would seem, chiefly for the purpose of enabling them to induce English financiers to enter into the proposed metal bank. The American companies were not in a hurry to bind themselves for so long a period. Negotiations dragged, the scheme taking the form finally of a bank in which the American companies were to be represented by four directors, the full board deciding from time to time upon prices and upon the amount of the production. In the meantime English capitalists hung back, and the load became unmanageable for the syndicate and its backer, the Comptoir d'Escompte. The severest blow to the latter was the withdrawal by the Russian Government of its deposit of 25,000,000 francs, followed by the suicide of the leading director and a run on the bank. Simultaneously the American companies, to relieve the situation, agreed at a meeting, at which the leading producers were gathered for the first time, to reduce production 20 per cent., the understanding being that all the mines with which the syndicate had contracts in other parts of the world would do the same.

Events in Paris followed one another in rapid succession. To avert a panic the Bank of France and a number of leading French bankers came to the aid of the Comptoir d'Escompte, advancing it very heavy sums, which enabled it to withstand a run. It is now understood that the Mathesons, a large concern, closely allied with the Rio Tinto Mining Company, the leading Spanish producer, have taken over a large amount of the copper originally held by the Société des Métaux and the Comptoir d'Escompte.

So far as the mining companies in this country are concerned, the situation is the following. Every one of them received

letters of credit on bankers like the Seligmans, Belmont & Co., Kidder, Peabody & Co., Brown Brothers, Ladenburg, Thalmann & Co., Müller, Schall & Co. and others for sums equivalent to the purchase price for the output of the guaranteed figure. While in the majority of cases these credits were only for one year's product, others were for the output for the whole period of three years. The mining companies delivered the copper to the agents of the syndicate, but drew against their credits only to the extent of those amounts of copper which were not sold to consumers in this country. The result has been that—at least with the majority of the Lake companies—only a small part of the sums secured to them by credits were drawn. The credits for the first year's product expire during the next few months, and it is probable that considerable balances will remain to the good of the bankers. They in turn appear to have principally worked with the Comptoir d'Escompte, although other French banking institutions are involved. Demands made by the mining companies upon the American bankers during the past few days have been promptly met. To the American mining companies the only uncomfortable feature about the situation is the certainty that the exceptional profits of 1888 are not likely to return for many a year. So far as the immediate future of the metal is concerned, it is pretty clear that the stock of the speculators is tied up in the hands of bankers who have loaned on it enough money to make it probable that the metal will not be sacrificed by throwing it over for what it will fetch.

The majority of large consumers in this country have made contracts up to June for Lake copper at 16½ cents. A few declined to enter into them, but the majority took at least a part of their needed supplies. Outside of the holdings of the syndicate and the bankers affiliated with it, very little, if any, Lake copper is available in this market, and not much can be returned from abroad in the original packages duty free. Unless some reasonable arrangement can be made their position is very unsatisfactory. The trade, the buyers in large or small quantities of copper goods, will certainly buy little or nothing now when lower prices for the raw material are established and still lower figures may be reached in the near future.

Failures in the Iron Trade.

It is a misfortune of the iron trade that undue importance is attached by the public generally to the failures occurring in it. A large dry goods firm may fail, or a great wool house may succumb to the force of adverse circumstances, and beyond the attention given to it as a matter of news no special notice of it will be taken. Hasty generalizations as to the condition of associated interests will not be made by newspaper writers, but the particular occurrence will be permitted to stand on its own basis. But if an iron concern of any considerable importance yields to financial pressure the opinion at once prevails that the entire trade is affected by "dry rot" or some other distemper, and sensational reports and interviews are worked up by the enterprising conductors of the daily press. It appears to make no differ-

ence in such cases if special circumstances in no way connected with the legitimate manufacture and sale of iron have precipitated the catastrophe. It would seem that the outside world firmly believes that the manufacture of iron is either so very profitable that errors of judgment will not seriously affect balance sheets, or so universally unremunerative that the failure of one establishment is but the precursor of widespread ruin. When the latter view is taken and a general alarm is sounded, it is remarkable that more failures do not occur through the impairment of confidence which must follow.

The iron trade of this country is not in a condition of demoralization or impending collapse, even if the recent failures would seem to convey that impression. Those who are immediately affected by these failures have good reason for taking a despondent view of the situation, but the great mass of the people who are not thus brought into positive contact with the resulting pecuniary loss or are not thrown out of employment should not permit their sympathy to control their judgment. At a time of widespread financial derangement, as in the years following the war, there was reason for grave apprehension when failures occurred. Every failure of any magnitude in such a period precipitated a train of evils involving whole communities in distress. Timidity and excessive caution controlled the money lenders, and, as nobody could foresee how sound financial order was to be brought out of the chaos of conflicting views among statesmen and students of political economy, it was no wonder that confidence almost ceased to exist and that credit became merely a tradition. It required years to correct the troubles which existed, manufacturers being obliged to accumulate fresh capital, which was a very slow process. At length upon that foundation was erected a new edifice of faith in the successful prosecution of ordinary business ventures, which exists to-day, and will continue to exist if it is not undermined by the foolish work of those who are now proclaiming general demoralization.

Possibly the recollection of those distressful times is the underlying influence causing apprehension now, particularly among those who regard the iron business as an unfailing barometer showing the condition of general trade. If they will reflect for a few moments they will remember that in 1884 and 1885 the country passed through a period of liquidation following an era of excessive railroad building and speculation. Prices dropped then to unprecedented rates, and a number of manufacturing establishments were forced to the wall. Yet there was no general demoralization, and confidence was not seriously impaired. In some parts of the country heavy investments were made during that very time in new manufacturing enterprises. The finances of the country were not deranged, and capitalists shrewdly argued that we were merely taking breath after severe exertion, which would be followed in due time by another forward movement. This came in 1886 and 1887, and those who had prepared for it reaped their justly earned profits. The country is again resting, and although prices have receded to rates still lower than those of 1884 and 1885, this is not an

unmixed evil and by no means does it portend universal bankruptcy in the iron trade.

It would be marvelous indeed if a condition of business would ever be realized in which failures would not occur until some calamity overwhelmed the entire trade. Such a peculiar state of affairs is not to be expected as long as business ventures are made with insufficient capital or at points possessing inferior resources, or by persons lacking some of the essential elements of successful management. A combination of unfortunate circumstances, such as the sudden curtailment of the demand, diminished prices and bad debts, may precipitate a failure independently of the causes just enumerated, but they will considerably hasten a failure if they are additional and cumulative. As the iron trade is now suffering from a reduced demand and low prices, there may be other establishments whose financial soundness and business management will be severely tested, and in some cases with disastrous results, but no considerable proportion of their number will be forced to the wall. The public should not accept the complaints of manufacturers about their unprofitable and unsatisfactory business as evidence of the unsound condition of the entire trade. Many establishments are even now fairly profitable, many others are making both ends meet with tolerable precision, and most of the remainder will be able to worry through this dull period without serious consequences to their financial backers.

Amendments to the Interstate Law.

One of the last official acts of President Cleveland was the signing of the bill amending the Interstate Commerce act. These amendments do not in any way change the principles underlying the original bill. They are intended rather to punish violations with more severity. It is provided that joint rates shall be published and otherwise considered the same as through rates. Such in effect they are, but some technical doubts about them have been raised which are now dismissed. Taken in connection with the recent decision of the commission, which practically calls every shipment a through one when a through bill of lading is issued, whether the through rate is prorated or merely a combination of locals, it is clear that every possible help is to be given toward extending the power of manufacturers and merchants to reach every city and hamlet by a through rate. This, indeed, is the basis of much of our modern trade, and the extension of the system as far as possible is in the line of progress. Then, reductions of rates must be preceded by three days' notice. Additional precautions are taken to secure to the commission the powers of the courts necessary to carrying out its work and its decrees.

The most important section of the amended law is the one relating to frauds, or what has become known as underbilling. That part of it which refers to shippers of freight we quote in full:

Any person and any officer or agent of any corporation or company who shall deliver property for transportation to any common carrier, subject to the provisions of this act, or for whom as consignor or consignee any such carrier shall transport property, who shall

knowingly and willfully, by false billing, false classification, false weighing, false representation of the contents of the package, or false report of weight, or by any other device or means, whether with or without the consent or connivance of the carrier, its agent or agents, obtain transportation for such property at less than the regular rates then established and in force on the line of transportation, shall be deemed guilty of fraud, which is hereby declared to be a misdemeanor, and shall, upon conviction thereof in any court of the United States of competent jurisdiction within the district in which such offense was committed, be subject for each offense to a fine of not exceeding \$5000 or imprisonment in the penitentiary for a term of not exceeding two years, or both, in the discretion of the court.

If any such person, or any officer or agent of any such corporation or company, shall, by payment of money or other thing of value, solicitation, or otherwise, induce any common carrier subject to the provisions of this act, or any of its officers or agents, to discriminate unjustly in his, its, or their favor as against any other consignor or consignee in the transportation of property, or shall aid or abet any common carrier in an such unjust discrimination, such person, or such officer or agent of such corporation or company, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof in any court of the United States of competent jurisdiction within the district in which such offense was committed, be subject to a fine of not exceeding \$5000, or imprisonment in the penitentiary for a term of not exceeding two years, or both, in the discretion of the court, for each offense; and such person, corporation, or company shall also, together with said common carrier, be liable, jointly or severally, in an action on the case to be brought by any consignor or consignee discriminated against in any court of the United States of competent jurisdiction, for all damages caused by or resulting therefrom.

Another part of the same section provides the same penalties for any officer or employee of any railroad who shall by the same means cause an unjust discrimination to be made in rates between one shipper and another. We know from reports and investigations already made public that the state of things described in these sections had become common. And while it is fair that merchants should be condemned as well as railroad men, it should not be forgotten that the responsibility for the condition of things which demanded this legislation rests largely upon the carriers themselves. By special agreements with shippers in the past to carry certain articles below the regular tariffs by billing them under false weights or descriptions these competing railroad agents have urged upon shippers the very practices which the carriers have been denouncing, and thus fastened the objectionable underbilling upon the whole business community. In this as in so many other things in trade it is the most unscrupulous railroad agent or shipper who sets the standard for all the rest. It is this standard which it is the province of Government to regulate. The old idea that Government should let everything alone to regulate itself is not now followed. We have laws regulating the employment of children and the compulsory stoppage of work on Sundays, for example. If these were left to conscience any single manufacturer or dealer who should hire only children or work Sundays could soon compel every competitor to do the same. Thus we find Government regulating, not competition, but rather the conditions under which competition shall be carried on. So in the matter of underbilling.

We have no doubt that the new law will in the end be beneficial, though it may at

first work disturbance in those lines where business had settled down under the old system of getting a low rate because everybody else did and carriers contracted to give it. If the classification upon any article is too high, or if the tariff rate from any part of the country to any other part is so great as to be prohibitory, let the fact become known and let proper measures be taken for bringing about a change. In the interest of good business this is better than to meet one wrong by another or to disguise the shipment. In this matter of false representation and consequent cut rates the merchant who attempts to defraud is more easily detected than the carrier who underbills to give some shipper an advantage. But under the law we expect to see justice done to all parties concerned.

Protection of Maritime Commerce.

England relaxes no effort in her ambition to surpass all other powers in the strength of her naval armament. Increased expenditure by rivals for the same end operates as an incentive on her part to redoubled exertion. She realizes the preponderance of her maritime commerce as compared with that of other nationalities, and that just here is her most vulnerable point, to be guarded at any cost. The subject acquires a fresh interest just now in Great Britain from the fact that Lord Brassey, a recognized authority in naval affairs, a few days ago addressed a meeting held under the auspices of the London Chamber of Commerce—with any number of admirals and members of Parliament among his auditors—at which he sought to demonstrate the present insufficiency of the British navy and the necessity of more liberal expenditures upon this arm of the national defense. He pointed out that other powers less exposed on the open sea in case of hostilities would be enabled to employ their entire available force in offensive warfare. For this reason, therefore, the Admiralty in past experience have found it of the first importance to "seal up" the enemy by a blockade, keeping watch in the offing, thus limiting the power for mischief, rather than attempt to protect 40,000 ships and upward of 9,000,000 of tons scattered all over the world. But blockading service is more arduous than before the days of steam, as pointed out by Admiral Hornby in a supplementary speech, the modern blockading force being a constant consumer of coal, and consequently unable to keep continuously at sea. This fact makes needful an adequate auxiliary force in reserve.

These united arguments in favor of increased expenditure, deemed imperative to insure the continued naval supremacy of England, were made conclusive by a comparison with France and Russia. It was shown by a tabular statement that within the last 26 years England has expended in the construction of new vessels fully \$250,000,000, while France expended for like purposes \$162,000,000, and that in the present year the difference against France is nearly as three to two. Despite this present and prospective preponderance in favor of England, Lord Brassey declared that so far from being satisfied, the rate of augmentation "ought to be four to two," a sentiment that was warmly applauded. All efforts, the speaker contended, should

be concentrated on "the finest and fastest vessels the constructors of the period could produce." He emphasized the value of unarmed cruisers and expressed special satisfaction with the assistance to be obtained from the mercantile marine for its own protection. All the leading mercantile powers—Italy, Germany, the United States and France—have given liberal encouragement to the building of steamships capable of conversion into fast-sailing cruisers. Admiral Hornby, whose magnificent views of the requirements of the British navy have excited much remark, not only concurred in the demands of his predecessor, but insisted that at least 300 cruisers would be wanted at the outbreak of war.

Naval authorities at Washington will doubtless take note of proceedings in London and govern themselves accordingly. A practical hint is conveyed by the expression of one of England's best naval authorities to the effect that the *furore* that accompanied the introduction of ironclads and armored fleets is being succeeded by a wholesome reaction, and that swift cruisers, comparatively unprotected, constitute, in fact, the right arm of the national defense. Herein we find a tacit recognition of principles that are fully accepted in the practice of the Naval Board of the United States. At the same time, heavy armaments, dynamite guns, torpedoes and kindred warlike appliances all have their appropriate place. To provide plants on a scale commensurate with the demands of modern warfare must for years to come tax the best energies of all leading commercial powers. The United States cannot afford to pose as an indifferent observer of events.

The Blast Furnaces March 1.

As will be seen from the details given below, the capacity in blast has slightly increased, although there has been a falling off both in the anthracite and in the charcoal plants. This is due to an increase in the capacity of the coke furnaces. Although the number has not been greater, the output has been somewhat heavier.

On the first of the month the status of the anthracite furnaces was:

Anthracite Furnaces March 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	14	11	3,296	13	3,792
New Jersey.....	13	5	2,183	8	2,302
Spiegel.....	3	3	229	0	0
Pennsylvania:					
Lehigh Valley...	44	24	8,739	20	6,707
Spiegel.....	1	1	70	0	0
Schuylkill Valley.	38	24	8,916	14	4,130
U. S. Susquehanna Valley.....	17	11	3,642	6	1,256
Lebanon Valley.....	16	13	6,307	3	1,193
L. Susquehanna Valley.....	22	11	4,555	11	3,420
Total.....	178	103	37,937	75	20,880

For a year past our records show the following:

	Furnaces in blast.	Capacity per week.
March 1.....	103	37,937
February 1.....	107	39,187
January 1, 1889.....	107	38,726
December 1, 1888.....	99	34,879
November 1.....	95	33,645
October 1.....	95	33,728
September 1.....	92	33,541
August 1.....	93	33,397
July 1.....	92	32,478
June 1.....	99	32,418
May 1.....	96	31,003
April 1.....	94	30,496

March 1.....	98	25,508
February 1.....	97	29,989
January 1.....	118	38,206

There have been no changes in New York or New Jersey. In the Lehigh Valley Crane is now running four out of five, Thomas eight out of twelve, Bethlehem two out of seven, Glendon two out of five, Coplay one of three and Lehigh both. In the Schuylkill Valley Norristown and No. 3 Phoenix blew in during February, while Merion went out. No change is reported from the Upper Susquehanna or from the Lebanon Valley, while in the Lower Susquehanna Valley one of the Chickies furnaces went out for repairs and improvements. Montour went out on the 2d.

The month opened with the following coke furnaces in blast:

Coke Furnaces March 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	3	1	1,144	2	2,300
Pennsylvania:					
Pittsburgh district.....	18	18	21,695	0	0
Spiegel.....	1	1	556	0	0
Shenango Valley.....	19	15	10,422	4	2,806
Juniata and Conemaugh Valley.....	18	11	5,906	7	2,460
Spiegel.....	1	0	0	430	
Youghi. Valley.....	5	4	1,625	1	600
Miscellaneous.....	4	3	1,688	1	650
Maryland.....	2	0	0	370	
West Virginia.....	6	3	2,715	3	538
Ohio:					
Mahoning Valley.....	14	11	9,002	3	2,517
Central and Northern.....	18	12	8,451	6	4,604
Hocking Valley.....	14	6	1,776	8	3,038
Hanging Rock.....	13	8	1,927	5	1,210
Indiana.....	2	2	431	0	0
Illinois.....	12	7	8,442	5	4,318
Spiegel.....	1	1	730	0	0
Wisconsin.....	3	2	1,085	1	500
Missouri.....	6	2	1,135	4	1,580
Colorado.....	2	1	490	1	450
The South:					
Virginia.....	12	9	4,021	3	2,117
Kentucky.....	4	4	1,290	0	0
Alabama.....	22	18	10,543	4	1,650
Tennessee.....	11	10	4,854	1	290
Georgia.....	2	1	501	1	275
Total.....	213	150	106,757	63	32,708

As compared with previous months, these figures stand as follows:

	No. of furnaces.	Capacity per week.
March 1.....	150	10,757
February 1.....	150	98,518
January 1, 1889.....	157	103,726
December 1, 1888.....	151	101,748
November 1.....	146	94,085
October 1.....	137	85,461
September 1.....	133	81,082
August 1.....	122	74,855
July 1.....	121	69,543
June 1.....	128	75,427
May 1.....	130	25,815
April 1.....	128	20,644
March 1.....	128	68,802
February 1.....	126	73,912
January 1.....	143	83,101

In the Pittsburgh district all the furnaces are active. Clinton, operated by a syndicate of creditors of Graff, Bennett & Co., is again working. Laughlin & Co. have reconsidered their plan of tearing down their two old furnaces, having repaired and started one of them. The other has been dismantled. This increases the number of furnaces in Allegheny County to 19. The new Carrie is rapidly approaching completion, and will be ready not later than May 1. We may note that the output of the two Isabellas for February was the largest in their history, being close upon 3000 tons per week for both. Soho, too, made a good record for a new furnace.

Nothing is reported from the Shenango, Juniata and Conemaugh or Youghiogheny valleys, except that Charlotte was banked for a few days for repairs. In Maryland Catoctin, which was banked during February, was blown in. The West Virginia furnaces are making good records, their aggregate February product being 10,860 gross tons. In the Mahoning Valley Thomas resumed on the

27th ultimo, and Girard lost 10 days to make repairs. In the Hocking Valley Glasgow and Floodwood are out, leaving only Akron, Bessie, Crafts, Fannie, New York and Winona at work. Among the other Ohio furnaces no changes have taken place. The Illinois furnaces produced in February 38,009 gross tons, including spiegel, against 53,494 tons in January, the decrease, of course, being due to the stoppage of the Union plant.

The only facts worthy of recording in connection with the Southern pig iron producers are that the new No. 2 North Birmingham furnace, of the Sloss Company, blew in the 12th ultimo, and that Bibb stopped work. In the near future the second De Bardeleben, the fourth Ensley and the Trussville furnaces will be added to the list, the latter awaiting only the laying of the sidings. Sheffield, too, expects to see some of its completed stacks make their first cast at an early date. In Kentucky the second Ashland started on the 20th ultimo.

The condition of the charcoal furnaces was as follows:

Charcoal Furnaces March 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	14	8	605	6	495
New York.....	10	8	132	8	600
Pennsylvania.....	23	21	115	21	959
Maryland.....	8	4	389	4	250
Virginia.....	23	0	0	23	943
West Virginia.....	3	0	0	3	165
Ohio.....	18	5	376	13	902
Kentucky.....	1	1	80	1	75
North Carolina.....	1	1	70	1	70
Tennessee.....	9	3	725	6	1,205
Georgia.....	2	1	60	1	54
Alabama.....	10	8	1,670	2	470
Michigan.....	25	11	3,841	14	3,370
Minnesota.....	1	0	0	1	150
Missouri.....	3	2	582	1	150
Wisconsin.....	10	4	1,595	6	810
Texas.....	1	1	176	0	0
California.....	1	0	0	1	210
Washington Ter.....	1	1	270	0	0
Oregon.....	1	1	275	0	0
Total March 1.....	167	55	11,081	112	10,981
Total Feb. 1.....	167	62	11,219	105	10,406
Total Jan. 1.....	169	67	11,946	102	9,822
Total Dec. 1.....	169	71	12,286	98	9,307
Total Nov. 1.....	169	73	12,724	90	8,941
Total Oct. 1.....	175	71	11,619	104	9,088
Total Sept. 1.....	176	67	11,243	109	10,004
Total Aug. 1.....	176	65	11,137	111	10,065

In New York Copake was to blow in again on the 10th inst. In Pennsylvania Mont Alto is still repairing, but will soon resume, and Pine Grove is expected to be ready for work early next month. In Virginia all the furnaces are idle. Walton and White Rock are, however, now getting ready for a blast. In Kentucky Bellefonte has probably stopped producing at this writing. In the Hanging Rock Region Bloom and Mount Vernon are getting ready. Jefferson will be out of blast at least three months for lack of charcoal. Michigan furnaces did well in February, making a total of 15,365 gross tons, as compared with 15,906 tons in January. Hinkle and Minneapolis continue to do good work in Wisconsin. In the South Gadsden is to start this month and Round Mountain reported that it would resume on the 4th inst.

The Warren Tube Works, at Warren, Ohio, which cost \$250,000 to erect three years ago, were on Tuesday appraised at \$30,000, and will be offered at sheriff's sale April 13. The sheriff on Tuesday levied on the property of the Lewisburg Nail Works, at Lewisburg, Pa., on execution issued on judgments confessed on the company's paper, amounting to \$32,000. Most of the indorsers are the directors of the company, and they took this step to save themselves as far as possible. There is also a mortgage of \$35,000 on the plant. The works were shut down.

CORRESPONDENCE.

Ball Bearings.

To the Editor: I notice in *The Iron Age* of February 21 an old acquaintance, "Ball Bearings," whom I supposed had departed from active life years ago. I believe its introduction to the mechanical world came partly through the writer by assisting in its adaptation to certain purposes, but without any claim to its invention, that being due to Mr. Kirk, who designed it for the reduction of friction upon the axles of light carriages. A full account of it and of its application to several steamers built at Philadelphia for taking the thrust of propeller shafts will be found in a communication to the *Artisan*, March number, 1856, published in London. This plan was also applied to take the weight of cranes in a large machine shop in this city previous to its publication in the *Artisan* and subsequently to the support of rudders in large ships. No doubt Mr. Grant's designs are original with him, but the many years which have elapsed since their first application to the identical purpose named by him is another example of the Scriptural aphorism, "There is no new thing under the sun."

W. J.

PHILADELPHIA, March 6.

Our correspondent, who is a very widely known mechanical engineer, does not, we believe, appreciate quite correctly the motive which led *The Iron Age* to publish Mr. Grant's designs for ball bearings. In the majority of cases probably their application will not be claimed to be new. The leading point in our estimation was the fact that through the development of the Simonds machine the cost of manufacturing true balls for bearings has been so much reduced that their introduction has been made far more widely possible. In order to demonstrate what may be accomplished by the use of ball bearings, we expect shortly to illustrate a machine intended for unusually heavy work and the durability of which has been greatly increased by the introduction of ball bearings throughout. While reducing the wear and tear, it does the same work it formerly did with less power.

The Economy of Recuperative Gas Heating Furnaces.

To the Editor: The Ajax Forge Company, of Chicago, have at their works two of my recuperative gas heating furnaces, one running since November, 1887, in connection with a train of rolls and other machinery, and is heating rails in lengths of 2 feet to 5 feet; the other is running in connection with a steam hammer in front and a power-former on one side of it, and is heating car axles or piles of scrap for the hammer and sometimes rail sections for both machines. The work-chamber of these furnaces is accessible from three sides, and the new furnace has doors in front and one side. To each furnace is attached a vertical tubular boiler 4 x 10 feet with firebox, forming the lower part of the stack. Both furnaces run day and night, and the steam made in these boilers is run into the main steam-pipe to help run the machinery of the works.

The rail furnace has to heat 28,000 pounds of rails, the capacity of the machinery, from cold to bright yellow in 22 hours or 1270 pounds in one hour, and consumes every 24 hours 6000 pounds of Illinois coal, or 250 pounds per hour. It has a hearth of 7 feet 6 inches by 5 feet 3 inches, with three doors. One of these is used for drawing while another is being charged. No cold

air enters the doors to chill the hearth and oxidize the charge; the shrinkage of metal due to heating is 2 per cent. Recently the amount of water evaporated by the rail-furnace boiler was measured by meter and found to be 347 cubic feet per 25 hours, or 868 pounds for one hour. An ordinary tubular boiler, evaporating at a rate of 8½ pounds of water from and at 212° per pound of Illinois coal, would require 124 pounds of coal to evaporate those 868 pounds of water from 50° to steam of 70 pounds pressure. In comparing the efficiency of this furnace with that of furnaces which do not furnish steam, these 124 pounds of coal have to be deducted from the total amount of 250 pounds, leaving 126 pounds of coal for heating purposes, which is equivalent to 198 pounds of Illinois coal per ton of rails heated from cold to bright yellow, the waste being 2 per cent. This every-day practice is considerably below the capacity of the furnace and the effectiveness of the system, because

1. The work of the furnace is limited by the capacity of the machinery; it has heated at the rate of 48 pounds of rails per square foot of hearth per hour and can do more.

2. The recuperator of the furnace is limited in size, on account of the mill floor being low down on the water in the ground.

3. The capacity of the vertical boiler (put up to economize space) is too small, as shown by the heat escaping from the top of the flues.

The new hammer furnace works quick and hot; it heats two car axles in one open door to soft white heat in 15 minutes—regular time, 20 minutes—with a shrinkage of metal equal to 2 per cent.; it will also heat 10 piles of 150 pounds each in 25 minutes—regular time, 30 minutes. These furnaces work with a continuous flame (no reversing) and occupy but little more space than ordinary heating furnaces. They can be built of any size and to suit special purposes.

Respectfully yours,

JOHN ZELLWEGER.

162 LA SALLE STREET, CHICAGO, ILL.

The Metal Exchange and Pig Iron Warrants.

To the Editor: The very interesting discussion which has for the last few weeks been carried on in your columns aent the newly established company for storing pig iron on warrants, and especially the thoughtful letter from Mr. Hull, as published in *The Iron Age* of February 8, prompts me to say a word or two on behalf of the members of the New York Metal Exchange, who naturally look upon this new departure with much interest. We believe that to encourage speculation in great commodities of trade is a good thing, not only in systematizing the speculation which will inevitably exist as one of the impulses of human nature, and removing many of the elements of unnecessary risk, but also and perhaps even more, by relieving those who manufacture, consume or deal in a given commodity for such a profit as represents only the legitimate reward of their industry and return on their capital from the necessity of taking speculative chances of price, under which they lie when there is no distinct class of speculators to assume these risks.

But apart entirely from the ethics, as it were, of speculation as ordinarily incident to a warrant system of storage, it seems almost incredible that any one should dispute for a moment the benefits of a large stock of goods in moderating the violence of fluctuations, and the danger to trade in the absence of such a stock; and even more incredible that speculators should have failed to grasp the abnormal position of iron in this respect. It is as if a great city

like New York should depend for its water supply on the casual flow of streams in its vicinity, without providing by means of reservoirs for such a reserve as would supplement the natural sources in the event of drought or meet an unexpected consumption as the result of sudden activity in factories using water or a spell of warm weather that would increase the demand for drinking and bathing purposes. If we can imagine a community so imprudent as to place themselves in such a predicament, we can readily picture their sad plight in case of need and the eager competition of capital to control the few days' supply of water that would be available under such circumstances.

Yet precisely a similar condition exists in regard to iron to-day, and the many industries dependent upon that useful metal are at the mercy of the purely speculative elements of the country, which may at any moment seize upon and corner every pound of iron available for immediate needs, with a very small expenditure of capital. Or the article may actually corner itself in case of a marked revival of consumption, just as happened in the early months of 1879. At that time, or at the beginning of that year, the furnaces had on their hands unsold but 126,000 tons of iron, and stocks in second hands had become so far reduced as to be altogether inadequate to meet the extraordinary demand which then sprung up with the revival of trade. The inevitable result was a "boom" of colossal proportions, whose disastrous collapse has led every one to dread a repetition. The few speculators who were shrewd enough to grasp the situation at the proper time made money, but the net result to those actually engaged in the production or use of iron was a serious loss.

How near we are to a similar experience may be readily seen when we consider that although the actual stock in sight is larger now than it was nine years ago, the proportion to annual output is a trifle less, being 4½ per cent. at the end of 1879, and only 4½ per cent. of the production at the end of 1888, while the stocks which are not held by the furnaces are even smaller now than then and the current price is hardly \$1 per ton higher. Contrast this showing with that in Great Britain and we may judge how weak are our safeguards as compared with those which have been accorded by the use of the warrant system abroad. Coal's stores have for years contained an amount of iron never less than 70 cent. of all the iron produced in Scotland annually, and at present hold over 1,000,000 tons, just about as much as was made during 1888. The various stocks which can be traced through England and Scotland aggregate over 2,000,000 tons, or seven times as much as the reserve held in this country, although the British annual production averages not more than 500,000 tons above the American, the respective figures being 7,500,000 to 8,500,000 tons and 6,000,000 to 6,500,000 or 7,000,000.

The results are very apparent. While our prices are ranging from \$17 to \$25, the extremes in foreign quotations are rarely more than \$2 a ton apart. At the time of the boom of 1879-80 we saw an advance of \$25 and a decline of \$20 inside of 18 months; but the highest price in the Scotch market was only \$8 above the lowest during this period, although the wild fluctuation in our market had a strong effect on the foreign one. Our permanent range of price is higher than that in Glasgow and Middlesboro' for a variety of reasons, but English and Scotch ironmasters enjoy a steady market, from which they can in the long run be more certain of a remunerative business than our own furnace men, who are strangers to any condition of affairs other than a hand-to-mouth dependence on the changes of the market. For this regularity of trade the foreign

makers are chiefly indebted to the reaction upon one another of systematic speculation and the warrant system that prevails in a number of the British iron centers. The speculators not only allay extreme fluctuations by their readiness to buy at each decline or sell out whenever a slight rise shows them a small profit, the many interests involved constantly operating as a check upon each other; but the speculative contingent also serves another purpose in the new capital which it attracts to investment in iron, creating, as it were, a new kind of consumption, which absorbs the increased stocks brought into being by the warrant system. Without the latter there will still be speculation, but it will be of the hurtful kind that aggravated the natural corner of 1879; and it is of this kind that we stand in danger today. For there cannot well be imagined a more likely chance for making a large sum of money than for a few gamblers in the public necessity to buy up the ridiculously small supply of iron in sight, and hold the iron trade at their mercy. At the first sign of a rapid growth in consumption, such as is sure to come sooner or later, we may depend upon it that the opportunity will be availed of; for there is not a single commodity of importance in which there is such a paucity of reserve to act as a balance-wheel upon prices as is the case with iron. Rarely less than 25 per cent. of the year's crop of wheat, corn, cotton or coffee is carried in stock; but our stock of iron is no larger than it was when we produced annually three-fourths of our present output; is one-seventh that carried by a country possessing but a slightly larger trade, and is, as Mr. Hull has already pointed out, barely sufficient to meet the absolute needs of the people if our furnaces were to simultaneously shut off their blast for a single fortnight.

This is a dangerous situation for all except the men who may hope to be successful in the eventual speculation, and it behoves the really conservative element of the trade to carefully consider the fact that the stock of iron grows steadily less in proportion to the need for it, and to do their best to remedy this by lending a cordial support to any measures that will encourage the accumulation of a suitable reserve.

TALLMADGE DELAFIELD,
President New York Metal Exchange.
NEW YORK, March 8.

John Ericsson.

This illustrious engineer was born July 31, 1803, in the province of Värmland, Sweden. He died in this city on Thursday night last. The accompanying engraving, for which we are indebted to *Harper's Weekly*, is pronounced by his secretary, S. W. Taylor, to be the best portrait. His father, Olof Ericsson, was proprietor of mines, his mother, Sophie, being the daughter of an iron-master, Nils, John Ericsson's elder brother, rose to be baron, colonel of engineers, chief of the state railways, and with his three sons sat in the Swedish Diet. At the age of 10 John Ericsson constructed a miniature sawmill and a pumping machine that attracted the notice of Count Platen, chief of the great ship canal intersecting the Swedish peninsula. At 12 the youthful contriver was made a cadet of mechanical engineers; the following year a leveler on the canal. At 17 Ericsson entered the army as ensign and rapidly reached a lieutenancy in consequence of his beautiful military maps, which had attracted the special attention of King Charles John (Bernadotte).

When about 22 years old Lieutenant Ericsson constructed a flame engine of 10 horse-power, and journeyed to London in 1826, on leave, to introduce it. Once

there he resigned his commission. The resignation was accepted, but first he was promoted to a captaincy. He has never returned to his native country, but from it has received many honors and decorations, while in 1867 a great granite monument, quarried by the unpaid labor of the miners, some of whom had worked for his father, was set up with gala festivities in front of his mansion, inscribed "John Ericsson was born here in 1803."

During the next few years in England Ericsson produced about 40 machines, of which a third were patented. They included a file-cutting device, an instrument for taking soundings (still in use), a hydrostatic weighing-machine, an apparatus for making salt from brine, a pumping engine, a rotary steam engine and a famous system of artificial draft for steam boilers, dispensing with huge smoke-stacks and economizing fuel. To the steamship *Victory*, in 1828, he applied the principle of condensing steam and returning the water to the boiler; and four years later he gave to the *Corsair* the centrifugal fan-blowers now generally used in American steam vessels. In 1830 he introduced in the locomotives *King William* and *Adelaide* the link motion for reversing steam-engines. In 1834 he superheated steam in an engine on the *Regent's Canal Basin*.

In 1829 the Liverpool and Manchester Railway had offered a prize for competing locomotives. Ericsson planned and hurried to completion an engine, the *Novelty*, in seven weeks. The *London Times* of October 8, 1829, said that in speed it "far exceeded" all competitors; that "it was the lightest and most elegant carriage on the road yesterday, and the velocity with which it moved surprised and amazed every beholder. It shot along the line at the amazing rate of 30 miles an hour." But Stephenson's *Rocket* proved superior in point of traction. "In locomotive engineering," wrote John Bourne nearly half a century later, "nothing more original or more elegant has been produced than the *Novelty*." Ericsson in 1829, nearly three-score years ago, constructed a steam fire-engine employed in putting out a fire in the Argyle Rooms. Another the next year guarded the Liverpool docks; a third was sent to Berlin. Ten years later, in 1840, the Mechanic's Institute of New York gave its large gold medal to Ericsson for the best system of fire-engines.

His famous caloric engine was produced in 1833. The scientific world of London hailed it with astonishment. Lardner, Ure, Faraday and Sir R. Phillips gave special attention to it. The high temperature evolved prevented that first machine from becoming practical, while 20 years later, in 1853, a voyage of the caloric ship *Ericsson*, a vessel of 2000 tons, 260 feet long, from New York to Washington and back, showed that, though economical in fuel, the new heated air motor could not produce speed enough at sea for commercial purposes, nor compete on any large scale with steam. Still it has been applied successfully in more than 6000 engines to minor useful purposes—pumping, printing, hoisting, grinding, telegraph instruments, sewing-machines, and so on. The American Academy of Arts and Sciences awarded the gold and silver medals of the Rumford premium to Ericsson "for his improvements in the arrangement of heat, particularly as shown in his caloric engines of 1858." This was the second bestowal of the Rumford medal in this country.

But we go back now to chronological order, and come upon that device of supreme importance, the screw propeller. In 1837 Ericsson built a tug, 40 x 80 feet, with 3 feet draught, having two propellers of 5½ feet diameter, invited the British Admiralty to inspect it, and towed their barge at a rapid rate; but their lords solemnly concluded that as the motive power was in the stern the novel

craft would not steer! Ericsson in 1839 came to America and in 1841 began to build the *Princeton*, the first naval vessel that ever carried her machinery under the water-line, out of the reach of hostile shot. This vessel dictated reconstruction to the fleets of the world. The *Princeton* included other inventions of Ericsson—a direct-acting steam engine of unusual compactness; a telescope smokestack, in place of the tall ordinary pipe; a centrifugal blower in the hold; a gun carriage with machinery for taking up the recoil, the self-acting lock allowing the gun to be fired accurately. The *London Mechanics' Magazine* has said: "The undivided honors of having built the first practical screw steamer, the first screw war ship, the first cupola (turret) vessel, belong to John Ericsson."

To this first turret vessel we now come. Such a device had been offered by Ericsson in 1854 to Napoleon III, and in the fall of 1861 he proposed it to our Navy Department. By extraordinary energy and executive skill the *Monitor* was launched, with steam machinery complete, 100 days from the laying of the keel plate, and arrived in Hampton Roads just in time to defeat, March 9, 1862, the Confederate iron-clad *Merrimac*, which had destroyed the *Cumberland* and *Congress* and was about to sink or disperse the rest of the Government's wooden fleet. But for the *Monitor* the whole face of the war might have been changed and European interference attempted.

A fleet of iron-clad vessels of the *Monitor* type was built with extraordinary rapidity after the victory at Hampton Roads. Six of them, in Charleston Harbor, within 52 days, were struck by hostile shots an aggregate of 629 times without one penetration of side armor, turret or pilot-house. The *Weehawken* defeated and captured the Confederate ram *Atlanta*, and the *Montauk* destroyed the *Nashville*. In 1864 the monitors captured the ram *Tennessee*. Russia, Sweden, Norway and Turkey adopted the American turret system, and when the *Miantonomoh* crossed the ocean even the British construction yielded, and carried it out on a far larger scale. During the last years of his life Ericsson proposed, for defensive war, to destroy the tremendous naval structures his system caused to be built up. His last iron vessel, 130 feet long, carried a submarine 16-inch gun 30 feet long, to discharge a projectile weighing 1500 pounds, and containing 300 pounds of gun-cotton, against an ironclad's hull, beneath the customary water-line armor belt, with such effect that water-tight compartments would be of no avail. As Ericsson called his locomotive *Novelty* and his impregnable battery *Monitor*, so he called this latter creation *Destroyer*.

The variety of Captain Ericsson's work was only less remarkable than its intrinsic importance. In 1851, at the London World's Fair, he exhibited an instrument for measuring distances at sea; a hydrostatic gauge for fluids under pressure; a gauge for the volume of water passing through pipes; the alarm barometer; a pyrometer; a measure for fluids by the velocity with which they pass through definite apertures; a sea-lead for use without rounding the vessel to the wind. His contributions to the Centennial Exhibition of 1876 are described in a volume of 600 quarto pages. Among his scientific investigations were remarkable computations of the influences tending to retard the earth's rotary motion, including the weight of material taken from below the earth's crest and piled above it by the hand of man.

Favored by the possession of a robust constitution and ample means, Ericsson was able to devote many years exclusively to the investigation of solar heat, and to the determination of the mechanical energy which the great luminary has in store for

mankind when the coal fields become exhausted. A sun motor, illustrated in "Nature," vol. xxix., page 217, was erected by the experienced engineer 1883 on his premises in Beach street.

The Reading Failure.

A meeting of the creditors of the Reading Iron Works was held at the office of the company in Philadelphia recently. George F. Baer, a director of the company and also its counsel, read a statement of the financial condition of the corporation, which showed the total liabilities to be \$1,927,783.22 and assets \$2,439,595.09. It was agreed to appoint a committee of three to conduct the mills temporarily. On this committee the company and the creditors were represented, the former by the appointment of Director Simon Seyfert and the latter by Mr. F. Patterson, a heavy creditor. F. W. Swink, the general manager of the works at Reading, was the other member chosen. The committee will continue in control for the time being, and in the meantime a careful appraisement of the assets will be made. For this purpose a second committee of five was named, and upon this the creditors and the company were given representation. The members of the committee are John Cole, of New York; John H. Hagan, of Philadelphia, a prominent iron man; R. McIlvaine, of Reading; William Frich and Albert Foster, of the Philadelphia and Reading Railroad Company. Another committee will go to work at once and prepare a plan of reorganization. This committee will report at a meeting to be held on Thursday, if possible, or if not then at a meeting the date for which will then be agreed upon. The members of the committee are all bankers and are as follows: President Rogers, of the Tradesmen's Bank; E. T. Clark, Edward H. Nichols and Peter Hollis. A statement of the assets and liabilities is as follows:

Assets.

Real estate—tube works plant	\$406,772.88
Rolling mill	88,000.00
Furnaces	313,750.43
Scott foundry	357,728.13
Sheet mill	206,573.11
Steam forge	107,700.00
Ice machine plant	4,214.99
Iron ore, leasehold and fixtures	23,985.09
Gibraltar Iron Works	64,137.13
Camden Tool and Tube Works	35,000.00
Water-works, Reading	17,700.00
Limestone quarry	6,500.00
Scarborough land	2,068.50
Jenkins purchase	4,076.36
Indian trust land, Kansas	1,732.36
Bedford coal land	5,000.00
Hartford ore land and fixtures	2,717.42
Geo. Russell, real estate	400.00
Real estate & dwellings, Reading	45,600.00
Lehigh avenue real estate	100,000.00
Sundry real estate	11,850.00
Boone property	1,538.68
Wm. Crouse property	429.00
Chester land	26,575.50
Stocks, bonds and mortgages	47,293.25
Materials, goods and supplies at works	252,392.30
Work on two cotton presses	30,000.00
Stock in warehouse	98,406.50
Book accounts due to company, general	65,581.20
Book accounts due to company, warehouse	70,118.98
Bills receivable	8,145.76
Cash	19,603.32
Total	\$2,439,595.09

Liabilities.

First mortgage issue	\$590,000.00
First mortgage held for hunter dower	10,000.00
Bills payable	630,790.69
Open accounts due by company, general	194,059.71
Open accounts due by company, warehouse	28,240.53
Loans	170,000.00
Indorsements on bills received on unfilled orders	287,692.29
Wages unpaid	11,000.00
Total	\$1,927,783.22
Leaving a balance of assets of	501,811.87

The above statement does not take into account in the liability column the capital stock of the company, which amounts to \$1,050,000, consisting of \$550,000 in preferred stock, which was issued in 1884 to the creditors in the failure of the company in 1881, and on which 7 per cent. interest has been paid, and \$500,000 in common stock. Adding this capital stock to the liability account would leave an apparent deficit of \$548,188.13. The report of the committee appointed to make

sels would also suffer. The blockade of the American coast by a German fleet would soon arouse England and France, as cutting off their trade would very speedily draw those powers into antagonism. The advantage of the Samoan troubles if they go no further will be to show the necessity of a greater activity in rebuilding the navy.

In connection with his researches, Admiral Porter has prepared the following exhibit of the ships of the German navy:

Name	Crew.	Speed.	Tons.	Battery		When built.
				No.	Caliber.	
Preussen and Friedrichder	537	14	6770	4	10.25	
Grosse	2	6.70	1873
Kaiser and Deutschland	638	14.6	7076	8	10.25	1874
Sachsen Bayern Wurtemburg and Baden	354	14	7400	1	8.25	1878-86
Oldenburg	...	14	5206	6	9.45	1881
Hausa*	397	12	3610	8	8.25	1872
ARMORED GUNBOATS:						
Viper†	76	9	1100	1	12.00	1876
UNARMORED CRUISERS:						
Frey†	248	15	2017	8	5.91	1874
Leipsig and Prinz Adelbert	432	16	3025	11	6.70	1876
Besmark‡	404	14	2856	16	5.91	1877
Carola §	207	14	2169	8	5.91	1880
Alexandra	207	14	2370	12	5.91	1885
Ariadne and Liuse*	238	14	1710	2	4.72	1871-72
Blitz and Pfeil	127	16	1382	4	3.42	1882
Albatross	115	12	716	2	5.91	1871
Nautilus	115	10.6	716	2	4.72	1871
Cyclop	67	8	412	2	4.72	1874
Wolf, Hynene and Iltis	87	11	480	2	4.72	1878
Zieten	111	16	975	4	3.15	1876
Hobicht and Möwe	127	10.5	848	4	5.91	1879
Adler	...	10.3	833	1	4.72	1883

* Wood. † Sister ships to the Viper: Wespe, Biene, Scorpion, Muecke, Basilisk, Cameleon, Crokodil, Natter, Salamander and Hummel. ‡ Sister ships to Besmark: Blucker, Stosch, Moltke, Guelzow (1879), and Stein (1879), with two more of improved type building in 1885. § Sister ships to Carola: Olga, Maria and Sophia. || Building in 1885 two sister ships not yet named to replace Nympha and Medusa (of same class as the Alexandria).

an appraisement may change somewhat the figures in the asset column, as those given are taken from the books of the company, which are based on the original cost price.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., March 12, 1889.

The possibilities of the Samoan situation will for some time allay any apprehension as to the surplus. The startling reports concerning the Nipsic were a subject of profound concern in administrative circles. The discrediting accounts since received have allayed the excitement somewhat, but the President and his counselors have considered the situation and its possibilities very carefully, and are ready to act promptly should the crisis come. At the Navy Department there is also much activity. The Government will await further information, and unless some overt act of hostility shall have been committed the Berlin conference will be permitted to run its course in the line of an amicable settlement if practicable. The most careful study of the situation and its possibilities from a naval standpoint has been given by Admiral Porter. He admits that the navy is not sufficiently strong to cope with the German ships at present, but the ability to build ships and plenty of them with ample resources of money and material is in our hands. The Admiral says that a fleet of fast privateers to prey upon German commerce could be fitted out in 60 days at an outlay of not over \$50,000,000. There are 600 German steamers afloat which would be destroyed or driven from the sea. The sailing ves-

The Government has issued orders to accelerate the work on the vessels now being constructed, and the new ships authorized will be hastened through the preliminaries and gotten under way as speedily as possible. The opinion of Senators and Representatives in the city is decidedly in favor of the most comprehensive measures to meet the emergency. If the Samoan controversy should necessitate an extra session, the building of ships and manufacture of materials of war would involve an outlay of fully \$200,000,000, a large share of which would be expended in steel and iron. The stimulus to activity in the metallurgical industries would be without precedent. By July 1 contracts will have been let increasing the navy by over 15,000 tons.

The Ordnance Department of the army is making very satisfactory progress on the proposed gun foundry at Watervliet Arsenal, West Troy, N. Y. The plans have been completed and advertisements for proposals to construct the buildings have been made public. The plans for the machinery have also been prepared. General Benet is in hopes of having the foundry in such a state of advancement that the work of manufacture of guns will begin at the earliest possible day. In the fortification bill for the fiscal year of 1889-90 is an item of \$35,000 for the assembling of guns, which was the amount asked by the Ordnance Department as all that will be required for the next year. General Benet says that the gun foundry at Watervliet will, in a very short time, be one of the finest establishments of the kind in the world.

Australia will contribute £35,000 annually toward new British war ships.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 26 and 27 Washington street, CHICAGO, March 11, 1889.

Pig Iron.—The volume of business is still shrinking. While some dealers continue to report a fair run of orders, others have been unable to sell more than a few carloads of Iron during the entire week. At the same time, there is a decided diminution in the pressure to sell by furnace companies. Some of them have disposed of so much of their anticipated product for the year that they are asking advanced prices, which, of course, takes them out of the market for the time being. Others are instructing their agents to solicit no more orders for future delivery, having adopted the policy of offering Iron only when they accumulate a stock of some grade for which they have no contracts. It is reported that one of the strongest furnace companies in the South, financially, will shortly blow out their furnaces and await the return of better prices. This indicates the feeling in that section. Lake Superior Charcoal is in but limited demand, yet prices are sustained. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Coke, No. 1, \$16 @ \$16.50; No. 2, \$15 @ \$15.50; No. 3, \$14.50; Chicago Scotch, No. 1, \$17.50; Lake Superior Charcoal, Nos. 1 and 2, \$19.50; Nos. 3 to 6, \$20; American Scotch (Blackband), No. 1, \$18 @ \$19; Jackson County Silvery, No. 1, \$18 @ \$18.25; other Ohio Soft Irons, No. 1, \$17.25 @ \$17.50; Southern Coke, No. 1 Foundry, \$16.25 @ \$16.75; No. 2 Foundry and No. 1 Soft, \$15.75 @ \$16; No. 3 Foundry, \$15 @ \$15.50; Gray Forge and No. 2 Soft, \$14.50 @ \$14.75; Tennessee Charcoal, No. 1, \$19.

Bar Iron.—An improving demand is noted in some quarters, and there is a slight revival of Car work, with sales of small quantities for this purpose during the week. Prices are no higher, but, on the contrary, the market has been disturbed by reports of Iron of good quality being offered at rates far below anything hitherto considered necessary to effect sales. Carload lots of Good Common Iron are ordinarily quoted at 1.60¢ @ 1.62¢, half extras, f.o.b. Chicago, but these prices are shaded for large lots or good specifications. Store prices still range from 1.80¢ to 2¢, according to quantity and quality.

Structural Iron.—So far as can be ascertained, no large orders were placed, but fair prices are now being made of small lots. Prices are unchanged.

Plates, Tubes, &c.—Dealers report a very fair week's business, but no orders were taken running above 25 to 50 ton lots. Plenty of work is still in sight, and the prospects are quite bright in this branch of the trade. Collections, however, are not so good as they should be. Quotations are unchanged.

Sheet Iron.—Jobbers are beginning to place their orders with manufacturers of Black Sheets for summer and fall delivery. The movement in this direction is unusually early, but they do not propose to get caught again as they were last fall. Manufacturers' prices range at about 2.90¢, f.o.b. Chicago, for No. 27 Common Black. Sales are being made from store at 3.10¢ @ 3.20¢ for No. 27, but trade is very light at present. Manufacturers' agents have had a very good week in Galvanized, mill orders being much larger than for several weeks, while warehouse stocks have also been drawn upon quite actively. Jobbers quote small lots at 65% off for Juniata and 65% and 2½% off for Charcoal, but manu-

facturers' agents claim to be getting 62½% and even 60% for small lots of Juniata.

Merchant Steel.—Nothing new has occurred in this line. While prices are very low, they do not seem to attract consumers, and business is very dull. A leading Steel house notes as a curious feature of its February trade that the number of separate sales was much larger than for many months, while the aggregate tonnage was smaller than usual, indicating small stocks among its customers and their almost unanimous determination to buy only from hand to mouth. Quotations are unchanged.

Steel Rails.—The sales of the week have aggregated about 6000 tons, ranging from a 2000-ton order to a carload. While no improvement in the immediate demand can be noted, the manufacturers are feeling a little more cheerful over the prospect. Several deals are in progress, involving considerable quantities, and it is felt that as the season advances more Rails will certainly be needed by the railroads than they can now foresee. Quotations continue at \$30 @ \$30.50, according to quantity.

Railway Supplies.—More activity is reported now than at any time since the year opened. This is merely a comparative statement, however, as business is by no means good. Quite a large sale of Steel Splice Bars was made during the week, and a number of contracts were entered for Spikes and Bolts. Competition among the manufacturers is very keen, and the following quotations can probably be shaded on large lots: Splice Bars, 1.75¢; Spikes, 2¢; Bolts, with Hexagon Nuts, 2.65¢.

Old Rails.—The last sales of Old Iron Rails reported were made at \$21, but the quantity now to be had is very limited, and as holders are quite stiff in their views it is difficult to determine what the market price is at present. Although this would seem to warrant the expectation of higher prices, dealers are conservative, and the best posted are inclined to believe that no further advance will be made. Old Steel Rails are worth \$14.50 @ \$15 for short lengths; \$18 @ \$20 for long lengths or \$16.50 as they run. Old Car Wheels are variously quoted by dealers at \$18.50 @ \$19, but no transactions of consequence have transpired.

Scrap.—Old material is moving, but only in small quantities, consumers buying sparingly. The railroads are offering a great deal of Scrap at present, so that stock is abundant. An inquiry for a large lot of Mixed Steel is in the market, which is something novel. Mixed Country Scrap is worth \$13 @ \$14. Regular quotations to consumers are as follows, \$ per ton of 2000 lb: No. 1 Railroad Shop, \$19 @ \$20; Mixed Track, \$18 @ \$19; Fish-Plates, \$21; No. 1 Mill, \$14 @ \$15; Pipes and Tubes, \$13 @ \$14; No. 2 Mill, \$9.50; Axles, \$25; Horseshoes, \$18 @ \$19; Machinery Cast, \$13; Stove Plate, \$10.50; Cast Borings, \$8.50; Wrought Turnings, \$11 @ \$12; Axle Turnings, \$13; Mixed Steel, \$10.50; Coil and Leaf Steel, \$15; Tires, \$15 @ \$16.

General Hardware.—Business in Shelf Hardware is not evenly distributed at present, some houses reporting a most excellent state of trade, while others note a decided falling off. Prices appear to be at a standstill. The manufacturers of the coarser classes of goods are inclined to curtail production, and with a little increase in the demand their prices would be decidedly firm. As to the jobbing trade, while there is very sharp competition in progress, the disposition is growing to try to get a little more profit out of their business this year than last. Margins have been cut so closely that it is necessary to do an enormous trade to secure

even a reasonable return for a year's work and risk. In the Heavy Hardware line a similar condition of trade prevails, some houses finding the demand very light, while others are enjoying a good run of business. Collections are very good for the season.

Nails.—The situation is unchanged from the manufacturers' standpoint. They are maintaining prices and making but small sales either of Steel or Wire Nails. The jobbers are stiffening up a little, but have not changed their regular quotations, which are as follows: \$2 @ \$2.05 for small lots and \$1.95 for carloads of Steel Nails, and \$2.40 for small lots and \$2.35 for carloads of Wire Nails.

Barb Wire.—While the demand has been very good, prices have shown no indication of improvement. Small lots of Painted are quoted at 2.75¢ @ 2.80¢ and carloads at 5¢ @ 10¢ per 100 lb less, with Galvanized at 60¢ per 100 lb more. The quotation of 2.65¢ in last week's issue for small lots of Painted was a typographical error. It should have been 2.75¢.

Pig Lead.—Consumers are apathetic, finding the demand for their products very light. A few carloads have been sold at 3.55¢ for Eastern shipment, but the local trade is not inclined to bid even 3.50¢.

Rogers, Brown & Co., who for the past eight years have occupied an office at 98 Dearborn street, Chicago, announce their removal March 15 to the Rookery Building, at Adams and La Salle streets. They will occupy room No. 309, on the first office floor. Quite a movement of Iron firms is in progress to this building. Rogers, Brown & Co. represent 23 furnaces, mainly Ohio and Southern.

The firm of Low & Woodruff has been succeeded by C. E. Woodruff & Co. as manufacturers' agents at 121 Lake street, Chicago. They are Western agents for Oliver & Roberts Wire Company and the Pittsburgh Wire Nail Company, as well as for manufacturers of Bar and Sheet Iron, Binders' Twine, Refrigerators, Bolts, Nuts, &c.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., March 12, 1889.

Pig Iron.—The market remains in about the same condition as noted a week ago. Prices are unchanged, while the demand is still slow, although large enough to absorb the local supply without affecting prices. Offerings from distant points are smaller than they were some time ago, and as reports West and South continue to be favorable makers in this vicinity are inclined to maintain firm quotations, with some degree of confidence that further improvement is only a question of time. The discouraging feature is that consumers do not see their way to a very active demand in the near future, so that orders from them are a little uncertain. Then all hope and the majority seem to expect a good business during the spring and summer months, but for the present it is more a matter of faith than an accomplished fact, so that purchases are made with a great deal of caution. Prices are believed to be at actual rock bottom; this seems to be conceded everywhere, but in spite of that consumers are not taking large lots. They argue that if the demand improves they can "catch on" at a very trifling advance, if not at to-day's figures, and it is not worth while to buy stuff unless they can see their way to use it. Hence with this feeling of indifference it is not to be expected that the market will show much vigor, although, as already mentioned, holders are firm, in sympathy with the West and South,

and also because of the comparatively light supply of good local Irons. The conditions, therefore, are all favorable for improvement if the right kind of a start is made, but whether it will be made or whether things will drift along as they are is for the future to disclose. Present prices are \$18 at tide or No. 1 Foundry, \$17 for No. 2 and \$15.50 for Gray Forge, with 50¢ more, or in some cases 50¢ less, according to circumstances. The majority of sales of good Irons during the week have been at quoted rates, or possibly a shade less to a very desirable customer, but on the whole the market shows an encouraging degree of strength, considering its environments.

Foreign Iron.—No sales of importance have been made, although bids of about \$19, c.i.f., duty paid, could be had for Bessemer. Asking prices as follows: Bessemer, \$19.50 @ \$20, c.i.f., duty paid; Spiegeleisen, \$28.25 @ \$28.50, c.i.f., duty paid, for 20%.

Blooms.—The usual movement is being made, at about last week's prices, the range being as follows: \$28 @ \$28.50, at mill, for Nail Slabs; \$29 @ \$30 for Sheet-Iron Billets; \$30 @ \$31 for Soft Tank, and \$35 @ \$36 for Flange purposes; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$41 @ \$42.50; Scrap Blooms, \$32 @ \$33 1/2 "Bloom" ton of 2464 lb.

Muck Bars.—The demand is smaller than for some time past, and prices show irregularity without much strength. The best makes are held at about \$27, delivered, although some are quoted at \$26 @ \$26.50, but buyers seem indifferent, and bids are hard to get except for small lots.

Bar Iron.—There is more doing in small lots, but large orders are scarce, so that mills are getting very little work ahead. The demand is, in fact, the poorest for years, and not only are prices at the lowest, but mills can only be run to about half or two-thirds their capacity, so that work cannot be turned out economically. At present the outlook is very discouraging, as there are no inquiries likely to lead to much improvement. The demand for Car building has fallen off to almost nothing, and the same may be said in regard to Skelp Iron, although at this season a very sudden turn might occur at any moment. Meanwhile prices are irregular and weak, ranging from 1.70¢ to 1.85¢ for Refined Bars, 1.70¢ @ 1.75¢ for Grooved Skelp and 1.85¢ @ 1.90¢ for Sheared, with no demand of special importance so far as known.

Plate and Tank Material.—There has been more demand for the past few days, including an order for Ship Plates to the extent of about 800 tons. There is also some demand for Boiler and Tank Plates, and quite a good demand for Bridge Plates. Prices are very low, however, and to stand any reasonable chance of securing an order offers must be made at figures that can hardly return a new dollar for an old one. Nominal quotations are about as follows (but on large lots lower figures have to be accepted): 1.90¢ @ 2¢ for Ordinary Plates and Tank Plates; 2.1¢ @ 2.2¢ for Universal Plates; Shell, 2.4¢ @ 2.5¢; Flange, 3.3¢ @ 3.4¢; Fire-Box, 3.5¢ @ 3.7¢; Steel Plates, Tank and Ship Plate, 2.1¢ @ 2.25¢; Shell, 2.7¢; Flange, 3¢ @ 3.1¢; Fire-Box, 3.1¢ @ 3.4¢.

Structural Material.—There is nothing new on the market, and the feeling is rather gloomy. Specifications on old contracts are coming in a little more freely, so that the mills are fairly busy for the time being, but there does not appear to be much new business in sight at the moment. Prices remain as before, viz.: Bridge Plate, 2¢ @ 2.1¢; Angles, 1.95¢ @ 2.05¢; Tees, 2.4¢ @ 2.6¢; Beams and Channels, 2.8¢ for Iron or Steel.

Sheet Iron.—The general demand is only fair, although there is a good inquiry for specialties, which is likely to result in several large sales before the end of the week. Prices remain as before for small lots:

Best Refined, Nos. 26, 27 and 28....3 @ 3 1/2%
Best Refined, Nos. 18 to 25....2 1/2 @ 3 1/2%
Common, 1/4¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28....4 @ 4 1/2%
Best Bloom Sheets, Nos. 22 to 25....3 1/2 @ 4 1/2%
Best Bloom Sheets, Nos. 16 to 21....3 1/2 @ 3 1/2%
Blue Annealed.....2 1/2 @ 2 1/2%
Best Bloom, Galvanized, discount.....65%
Common, discount.....67 1/2%

Steel Rails.—The market is still dull, and, while it is believed that things are shaping in the right direction for improvement, bids for large lots from the right kind of buyers are not to be had at present. Meanwhile a fair business is being done in small lots of Rails at \$27.50 @ \$28, at mill, and a considerable demand is reported for Blooms, Billets, &c., which, in a measure, renders the mills independent of a good deal of the Rail trade unless from such parties as make their trade desirable. Plenty of Rails could be sold by taking bonds in payment, but in the present state of the money market cash or its equivalent is a *sine qua non*.

Old Rails.—No sales to report as regards spot delivery. Lots delivered along lines of railroad in the interior are taken at \$24 @ \$24.75, but there are very few transactions on the seaboard. Shipments of T's are offered at \$23.75, and lots in store at \$24.50, but buyers manifest no interest in deliveries of this character.

Scrap Iron.—Firm and in good demand. Desirable qualities freely taken at rates quoted below: \$20.50 @ \$21 for cargo lots; \$21 @ \$21.50 for carload lots, delivered, or for choice \$22; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$23 @ \$24; Old Car-Wheels, \$17 @ \$18, Philadelphia.

Wrought-Iron Pipe.—The demand is fair for the season and a great deal of work is under financial consideration, and while the outcome will undoubtedly be very large, ultimately, there may be some delay before reaching a definite conclusion. In the meantime prices are weak and irregular, with nominal discounts as before, viz.: Butt-Welded Black, 55%; Lap-Welded Black, 65%; Butt-Welded Galvanized, 45%; Lap-Welded Galvanized, 55%; Boiler Tubes, 62 1/2%.

Nails.—No improvement can be reported in the condition of the Nail trade. Some of the mills have stopped work, but there is a good deal of pressure to realize in some quarters, so that prices are badly demoralized. Lots from store are quoted at \$1.90 @ \$2, but carload lots of some makes are offered at extremely low figures without meeting a very ready demand even then.

St. Louis.

OFFICE OF *The Iron Age*, 212 N. Sixth st.,
ST. LOUIS, March 11, 1889.

Pig Iron.—The improvement noted in last week's report continues, and it now looks as if bottom had been reached and the time for improvement has arrived. Furnaces do not appear anxious to dispose of their product to any great extent, and in some cases on brands that are popular are asking a clean advance of from 25¢ to 50¢ per ton. Gray Forge is quite active, and some good-sized orders have been placed during the past few days, and figures that were quoted three weeks ago would not be entertained to-day. One lot of 1000 tons was taken a few days ago by a local manufacturer on a basis of \$14, delivered here. Pipe mills, machine shops, foundries, stove manufacturers, &c., are all busy, and will soon be in the market to

replenish their stocks, which they allowed to run down in consequence of the depressed condition of trade. A more hopeful feeling is expressed all around, and inquiries are coming in that speak well for the future of the market. Prices are firm, and the figures quoted herewith are generally adhered to, and only in rare cases are concessions of any moment obtained. We quote as follows for cash, f.o.b. St. Louis.

Southern Coke, No. 1 Foundry, \$15.25 @ \$15.75
Southern Coke, No. 2 Foundry, 15.00 @ 15.25
Southern Coke, No. 3 Foundry, 14.25 @ 14.75
Gray Forge.....13.50 @ 13.75
Ohio Softeners.....17.50 @ 20.00
Lake Superior Charcoal.....21.00 @ 21.50

Missouri.

Charcoal Foundry, No. 1.....16.00 @ 16.50

Charcoal Foundry, No. 2.....15.00 @ 15.50

Tennessee.

Charcoal Foundry, No. 1.....17.50 @ 18.50
Charcoal Foundry, No. 2.....16.75 @ 17.50
Connellsburg Coke, f.o.b. East St. Louis, \$4.70; St. Louis, \$4.85.

Bar Iron.—The demand for Bars is very satisfactory and some good-sized orders are being booked, but at prices that are anything but remunerative. Railroad work is improving and its influence is being felt to a certain extent in this department. Notwithstanding the activity prices are so low that there is little or no margin for profit, and it is claimed that in some cases actual cost is not realized. Small lots from store are quoted at \$1.80; Carload lots are quoted at from \$1.65 to \$1.75, according to circumstances.

Barb Wire.—There is no improvement in this branch, as far as prices are concerned, and it is evident that manufacturers will be compelled to wait until the spring demand sets in to enable them to advance prices to a paying basis. The volume of business is satisfactory and indications point to a largely increased demand for spring consumption. Prices are quoted as follows: For carload lots Two and Four Point Painted, \$2.80; carload lots Two and Four Point Galvanized, \$3.40, f.o.b. St. Louis; less than carload lots, 5¢ additional.

Cleveland.

CLEVELAND, March 11, 1889.

Iron Ore.—Activity in Ore circles during the past week seems to have been confined almost exclusively to negotiations with the vesselmen regarding lake freights for the season. The result has been several season charters from Escanaba to Lake Erie ports at \$1.10, which means a season rate of \$1.20 from Marquette and about \$1.30 or \$1.35 from Ashland. Two or three charters from the last-named port, and also from Two Harbors, are reported at \$1.30. The rate from Escanaba seems to have been permanently fixed at \$1.10. This rate not only includes Ore delivered at Cleveland, but also at Buffalo for the Eastern furnaces. Negotiations are known to be pending for substantial quantities of Ore to the furnacemen in the East, who have hitherto used foreign Ore almost exclusively. The Anthracite district affords an entirely new market for dealers in Lake Superior Ore and promises to take care of any possible surplus. Although numerous inquiries have been received from the furnacemen in the Mahoning and Shenango Valleys during the week, it is said that no new Ore beyond that already mentioned in these columns has been sold. The fact that freight rates have been practically established will, however, hasten the opening of the market.

Pig Iron.—Increased firmness and additional advances in prices are reported. The steady demand for Iron has been unaccompanied, however, by any excited views about prices. Sellers seem indifferent about extending sales beyond the

Iron likely to be produced from the Ores already on hand. Prices are about 25¢ per ton above last week's quotations. Mill Irons are selling freely at about \$14.75 @ \$15, and all grades of Bessemer Iron are reported firmer. The following are quotations:

Nos. 1 to 6 Lake Superior Charcoal.	\$20.50 @ \$21.50
No. 1 Strong Foundry, Bessemer quality, per ton.	17.00 @ 17.50
No. 1 Strong Foundry, per ton.	16.00 @ 17.00
No. 2 Strong Foundry, per ton.	15.00 @ 16.00
No. 1 American Scotch, per ton.	17.00 @ 18.00
No. 2 American Scotch, per ton.	16.00 @ 17.00
No. 1 Soft Silvery, per ton.	17.00 @ 18.00
Mahoning and Shenango Valley Neutral Mill Irons, per ton.	14.00 @ 15.00
Mahoning and Shenango Valley Red Short Mills, per ton.	14.50 @ 15.50

Old Rails.—The market is still dull, with \$21 @ \$21.25 given as a fair price for Old Americans.

Nails.—Steel Wire Nails are now quoted at \$2.35, with no changes reported in other grades.

Ferdinand Schlesinger, president of the Chapin Mining Company, announces that M. A. Hanna & Co. have been appointed sales agents for the Chapin Ore. Existing contracts on Ore on Lake Erie docks will be settled by H. P. Lillibridge, who has been appointed general manager of the Chapin Mining Company.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, March 11, 1889.

Pig Iron.—There has been a fair volume of business in Pig Iron during the past week, but no special activity. The changes in prices have not been marked, but the tendency has been toward improvement, and on some grades of Southern Coke Iron there has been an advance of 25¢ per ton realized, which places them on a level with the production of Northern furnaces, which latter brands were held more firmly than Southern output during the break in the market. Charcoal Iron has been relatively easier than Forge grades, and Ohio Softeners and Silvers are reported in larger supply than will sell readily, but there has been no pressure to sell. It is mainly the large and strong buyers who have confidence in the market and are desirous of buying round lots for future delivery, yet even such buyers are not disposed to pay any material advance and no very large contracts have been reported closed, but there have been several 1000-ton lots. Gray Forge has sold at \$13.25; No. 1 Foundry at \$15 and Mottled at \$12.25 cash. The following are the approximate prices current here at the close for cash, f.o.b.:

Foundry.

Southern Coke, No. 1 (new classification).	\$15.00 @ \$15.50
Southern Coke, No. 2 (new classification).	14.50 @ 14.75
Southern Coke, No. 3 (new classification).	14.00 @ 14.25
Ohio Soft Stone Coal, No. 1.	15.00 @ 16.00
Ohio Soft Stone Coal, No. 2.	14.50 @ 15.00
Mahoning and Shenango Valley.	16.50 @ 17.00
Hanging Rock Charcoal, No. 1.	21.00 @ 22.00
Hanging Rock Charcoal, No. 2.	19.00 @ 22.00
Tennessee and Alabama Charcoal, No. 1.	18.00 @ 18.50
Tennessee and Alabama Charcoal, No. 2.	17.00 @ 18.00

Forge.

Strong Neutral Coke.	13.00 @ 13.50
Mottled Neutral Coke.	12.00 @ 12.50
Gray Forge.	13.00 @ 13.25

Car-Wheel and Malleable Irons.

Southern Car-Wheel.	20.00 @ 25.00
Hanging Rock, Cold Blast.	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.	21.00 @ 22.00

Manufactured Iron.—There has been a moderate volume of business without new features or essential change in prices.

Nails.—There has been a moderate demand and a steady market without essential change in prices. 12d @ 40d sell at \$1.95 @ \$2 per keg, with 10¢ rebate in

carload lots at the mills. Steel Nails sell at \$1.90 @ \$2, and Steel Wire Nails at \$2.55 @ \$2.60 per keg.

Old Material.—There have been moderate sales and a steady market for Old Rails at \$21 @ \$21.50, and for Old Wheels at \$18 @ \$18.50 per ton, spot cash.

Detroit.

WILLIAM F. JARVIS & Co., successors to Charles Himrod & Co., under date of March 11, 1889, report as follows: While there is undoubtedly a somewhat better feeling, yet the market here is by no means active. Other sections report an advance on some grades, but so far the rise has not reached this market. It is customary for most of the large buyers in this locality to place orders for 6 to 12 months' supply and have the Iron shipped as they may require during that time. Such furnaces as are willing to contract on this basis when prices are at the lowest point have no difficulty in disposing of their output; but those that sell only as they make realize better prices, although they do not sell in such large lots. Most of the Lake Superior charcoal furnaces are maintaining prices, but we have heard of some cutting being done, but to no great extent. With a quiet but firm market we quote as follows:

Lake Superior Charcoal, all numbers.	\$19.50 @ \$20.00
Lake Superior Coke, all ore.	18.75 @ 19.25
Lake Superior Coke, cinder mixed.	17.75 @ 18.25
Standard Ohio Black Band.	18.75 @ 19.25
Southern No. 1.	17.00 @ 17.50
Southern Gray Forge.	15.00 @ 15.50
Southern Silvery.	16.50 @ 17.00
Jackson County (Ohio) Silvery.	18.25 @ 18.75
Old Wheels.	18.50 @ 19.00

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, March 11, 1889.

Pig Iron.—The status of prices is now being looked upon with some degree of anxiety. For the past few days there has been a perceptible lull in the advance that was inaugurated some three or four weeks ago and there is not the continuous advance that was expected by most of the producing element South. Prices have not declined from the highest point reached, but now appear to be at a standstill. It is true that buying is very active and large blocks are being disposed of almost every day. Many large consumers are now buying ahead as much as the disposition of the producers will admit. It is evident that considerable quantities are being bought for speculation, although as yet but little has passed under the control of warehouse receipts. To what extent these transactions will occur will depend much upon the price in the future, for with but few exceptions this manner of handling their output is not looked upon with the highest degree of favor by the principal Southern producers. There are certain brands of Southern Irons that are still maintaining their position in the markets and are realizing \$14 @ \$14.50 for No. 1 at the furnaces, but many brands are being sold for \$12.25 @ \$13 for No. 1, f.o.b.

Louisville.

LOUISVILLE, KY., March 11, 1889.

Pig Iron.—The market has been quiet during the week, with few sales. Parties are in the market for Iron for long delivery, but their views are so low that furnaces are not disposed to sell. There is a good demand for Car-Wheel Irons, especially for deliveries running throughout the year, but offerings are being made lower than Lake Superior Car-Wheel brands have been sold here at any time in the past. Old Wheels are freely offered,

and some have been sold as low as \$17. We quote as follows:

Southern Coke, No. 1 Foundry, new classification.	\$14.75 @ \$15.25
Southern Coke, No. 2 Foundry, new classification.	14.25 @ 14.75
Southern Coke, No. 3 Foundry, new classification.	13.75 @ 14.25
Gray Forge.	13.25 @ 13.75
White and Mottled, different grades.	12.75 @ 13.25
Silver Gray, different grades.	13.00 @ 13.50
Southern Charcoal, No. 1 Foundry, No. 1 Mill, spot cash.	16.25 @ 16.75
Southern Car-Wheel, standard brands.	21.75 @ 22.75
Southern Car-Wheel, other brands.	18.00 @ 19.50
Hanging Rock Coke, No. 1 Foundry.	15.50 @ 16.00
Hanging Rock Charcoal, No. 1 Foundry.	19.50 @ 21.00
Hanging Rock, Cold Blast.	20.75 @ 23.75

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave., PITTSBURGH, March 12, 1889.

The general Iron and Steel industries continue in an unsettled and unsatisfactory condition. Overproduction, not only in this district but throughout the whole country, is the great source of the present state of affairs, but there is comfort in the fact that there is always a largely increased consumption of everything in this line in the spring and summer seasons, and it is confidently expected that orders will be coming forward pretty freely within the next few weeks. One of our best-informed manufacturers, who has given the matter a good deal of study, says that almost every purchaser of Iron and Steel in this district is losing money. Pig metal, he says, has fallen \$1.75 @ \$2 per ton since last fall, while the finished products have declined from \$3 to \$5 per ton. He says many of the mills would shut down only for the fact that they have their regular customers, who buy from them the year through, and they must keep them supplied, and this, too, at market rates, even if without profit. The same authority says in regard to wages: "The puddler gets \$5.50 in the Pittsburgh district, while the average price paid in all other parts of the United States is \$3.75 per ton and less. The wages paid in all other departments are proportionately greater than at mills in other districts. The Pittsburgh district pays the highest wages in the United States. This is one of the main reasons why we cannot run our mills at a profit under present circumstances. By the Pittsburgh district I mean all plants west of the city."

The coal trade is also in a very badly demoralized condition and additional failures are feared. All the down-river markets are very much overstocked and prices now ruling do not cover lay-down cost from Pittsburgh, and there appears to be no demand. Some of our oldest river coal operators say that in all their experience they never knew the business to be in as bad a condition as it is at present. The coke interest is also sympathizing with others, but as yet it is not so badly demoralized.

Pig Iron.—There is an increasing demand and the market is steady at the improvement noted in our report of a week ago. Consumers generally are buying freely, and some of them have covered their wants for from 30 to 60 days. Mill Irons have advanced 25¢ per ton, as compared with the lowest; there was no change in prices during the past week, and the market is steady, but unchanged. City furnaces are pretty well sold up, and there is now a chance for furnaces in other localities to sell in this market, but they are at a disadvantage in the matter of transportation, which is a big factor in the present condition of affairs. Consumers claim that there is nothing in the market for the products to justify them in paying more for the raw material; on the contrary, they say that the latter is higher relatively than the former, but they nearly

all feel like stocking up, as they usually do at this season of the year. There is an improved demand for Foundry Irons, and Bessemer Iron is steady at the recent advance. We quote price as follows:

Gray Forge Neutral.....	\$14.25 @ \$14.50, cash
All Ore Mill.....	15.50 @ 16.00, "
White and Mottled.....	13.50 @ 14.00, "
No. 1 Foundry.....	16.00 @ 16.50, "
No. 2 Foundry.....	15.25 @ 15.50, "
No. 1 Charcoal Foundry.....	23.50 @ 24.00, "
No. 2 Charcoal Foundry.....	21.50 @ 22.00, "
Cold Blast Charcoal	25.00 @ 27.00, "
Bessemer Iron.....	16.50 @ 16.75, "

Included in the sales reported were some 7000 tons Bessemer Iron at prices ranging from \$16.50 @ \$16.80, cash, and a lot of 1200 tons Neutral Gray Forge at \$14.50, cash, which is the ruling for standard brands.

Muck Bar.—There is some inquiry for futures, but very little for present delivery. We continue to give \$27, cash, as the ruling price, and consumers have no trouble in obtaining all they want for present or near-by delivery at the price quoted. Producers do not care to contract for delivery two or three months hence at the price quoted.

Manganese.—Sales of Ferromanganese at \$58.50 @ \$59, cash, for 80 %, with more doing of late. Spiegel is still quoted at \$28.50 @ \$29 for 20 %.

Manufactured Iron.—There is nothing new to note. Business continues light for the season, and prices are unsatisfactory and irregular, and it is difficult to give reliable quotations in consequence. It is hoped, however, that there will be a largely increased demand as the spring season becomes more advanced. And until there is no improvement in prices can reasonably be looked for. For best quality of Iron prices may be quoted on a basis of 1.70¢ for Bars, 60 days, 2 % off for cash, but poorer qualities can be obtained for considerably less. Skelp Iron is still quoted at 1.60¢ @ 1.65¢ for Grooved, and 1.90¢ @ 1.95¢ for Sheared.

Wrought-Iron Pipe.—There is a fair business, but no improvement in prices, which continue irregular and unremunerative. It is reported that an order for 18 miles of 10-inch pipe was placed here during the past week. Discounts are quoted as follows: On Black Butt-Welded Pipe, 60 %; on Galvanized do., 52½ %; on Black Lap-Welded, 70 %; Galvanized do., 57½ %; Boiler Tubes, 65 and 5 %; 2-inch Tubing, 11¢ per foot, net; 5½-inch Casing, 32¢ @ 33¢ per foot, net.

Old Rails.—There is more inquiry, but no sales have been reported for several weeks, in the absence of which we may quote \$23 @ \$23.50. Holders look for a pretty stiff market as soon as the demand opens up, and it is thought that some of the mills in the Shenango and Mahoning valleys will be on the market before long. Old Steel Rails quoted at \$17.50 @ \$18 for short and \$19 @ \$20 for long lengths.

Steel Rails.—The mills here continue to quote at \$28, cash, for small lots of from 1000 to 2000 tons, but a large order could be placed for considerably less. It is said that some large orders have been booked here at but little over \$26, cash. The Rail department of the Allegheny Bessemer Company will be in full blast in a few days; this is claimed to be one of the most complete mills in the United States, having been supplied with all the latest appliances and improvements. The Edgar Thomson mill has been doing some big work, having turned out one day last week 1150 tons of Rails.

Billets, &c.—Bessemer Steel Blooms and Billets are still quoted at \$27 @ \$27.50, cash, as to size, delivery, &c. Sale of 2000 tons Domestic Bloom Ends, at \$18, cash. Domestic Rail Crops may be quoted at \$18 @ \$18.50.

Merchant Steel.—The market for all kinds of Merchant Steel continues in a very demoralized condition; one of our oldest manufacturers remarked yesterday that he never knew the business to be in a worse condition than it is at present. Prices are being cut to such an extent that there is no margin for profit.

Railway Track Supplies.—Prices remain unchanged. Spikes, 2.10¢, 30 days; Splice Bars, 1.70¢ @ 1.75¢; Track Bolts, 2.75¢ with Square and 2.85¢ with Hexagon Nuts.

Old Material.—Demand continues light, while prices remain unchanged. No. 1 Wrought Scrap, \$20, net ton; Wrought Turnings, \$13 @ \$13.50; Car Axles, \$24.50 @ \$25; Cast Scrap, \$14.50 @ \$15, gross; Cast Borings, \$11 @ \$12; Old Car-Wheels, \$19.

Birmingham.

Office of *The Iron Age*,
28, Wilson House,

BIRMINGHAM, ALA., March 11, 1889.

Pig Iron.—The most notable thing in the Iron business of the Birmingham district is a perceptible stiffening, with very little selling. The Sloss Steel and Iron Company are well sold ahead, and, having got somewhat better prices than have been prevailing for some months, are cutting no figure in the local market. The Tennessee, Coal, Iron and Railroad Company furnaces here have light stocks, but are inclined to hold firmly in the conviction of an early better condition of the market. There has been a gratifying improvement in the business methods of furnace plants. Heretofore too many of the companies in this district have put up expensive plants, chiefly with the idea of enhancing the value of property, lands, &c., to sell early and get quick profits. Now there are signs of the business of Iron-making falling into the hands of real Ironmasters. When this occurs it is believed by the older and wiser heads that the Birmingham Iron district will be fixed on a better-paying, more substantial basis than ever. Movements are on foot for the erection within a few miles of Birmingham of four or five more furnaces, some by new and others by old companies. The Mary Pratt, the smallest, a 40-ton furnace, is out of blast. Interest in Steel-making is greater than ever. Reese & Henderson, of patent process fame, are in the city, and a visit from A. S. Hewitt and his brother-in-law, Edward Cooper, is arousing attention. Mr. Carnegie's recent visit here, and the favorable comments of himself and his distinguished companions, seem to have attracted more attention than ever to the advantages of Birmingham. There is a hopeful expectation also of improvement in the business situation generally to come from the conduct of the new Administration.

New York.

Office of *The Iron Age*, 66 and 68 Duane street,
NEW YORK, March 13, 1889.

American Pig.—The market has been quiet during the past week, reports of irregularities cropping up from time to time. We understand that the anthracite coal companies propose to lower the prices to the blast furnaces, that the railroads are about to afford them some relief, and that a reduction in price of Ore from Northern mines is imminent. Taken together, these reductions may enable Northern furnace men to lower cost somewhat. We continue to quote for standard brands Northern Iron No. 1, \$17.75 @ \$18; No. 2, \$16.25 @ \$17, and Gray Forge, \$15 @ \$15.50, all at tidewater. Southern Irons have been offered at considerably lower prices for Foundry brands.

Scotch Pig.—The market abroad has continued its advance; still sales here are

restricted and prices remain: Coltness, \$20.50 @ \$21; Shotts, \$20 @ \$20.50; Langloan, \$20 @ \$20.50; Summerlee, \$20.25 @ \$20.50 and Dalmellington, \$19.25 @ \$19.50.

Ferromanganese.—The market is fairly active and firm, with Ferro selling at \$56 @ \$57. Spiegel is dull and nominal.

Structural Iron.—Manufacturers report that considerable bridge work is offering, chiefly in small lots. During the past month or two quite a number of large contracts have been placed, among them the Brooklyn Elevated, the St. Louis Bridge, and the Pittsburgh improvement of the Pennsylvania Railroad. Among the orders now on the market is a bridge at Rochester which will call for about 800 tons. Prices on bridge work, however, continue very unsatisfactory, it being stated that they are lower to-day than they have ever been before. We quote Sheared Plates, 1.9¢ @ 2¢; Universal Mill Plates, 2¢ @ 2.1¢; Angles, 1.9¢ @ 2.1¢; Tees, 2.35¢ @ 2.5¢, and Channels and Beams, 2.8¢ on dock. It is reported that the North Chicago Rolling Mill Company have now joined the Beam Association, so that the only concern not a member of it is the Allentown Rolling Mill Company, who manufacture only smaller sizes.

Plates.—We quote Iron Tank, 2¢ @ 2.2¢; Shell, 2.25¢ @ 2.4¢; Steel Tank and Ship Plate, 2.1¢ @ 2.25¢; Shell, 2.35¢ @ 2.5¢; Flange, 2.6¢ @ 2.75¢, and Fire-box, 3½¢ @ 4¢.

Bar Iron.—We quote: Carload lots on dock, half extras, Common, 1.65¢ @ 1.7¢; Medium, 1.7¢ @ 1.75¢, and Re-fixed, 1.75¢ @ 2¢.

Steel Rails.—We note sales aggregating about 30,000 tons by two Eastern mills, chiefly for Southern railroads. Twenty-three thousand tons of the above was taken by one mill, which has acquired by purchase a part of the allotment of one of the idle mills, the Board of Control last week having decided not to increase the allotment for the present. It is understood that the Western mills were opposed to such an increase for the present, their sales to date having been considerably less, proportionately, than those of the mills east of the Alleghany Mountains. The Board of Control reports sales to March 1 of 590,850 tons, the allotment being 790,850 tons. The shipments up to March 1 by the Rail mills were 142,787 tons. In the West the market appears to be quiet, the only sale reported being that by a Pittsburgh mill of 10,000 tons. There have been a number of rumors in reference to the consolidation of the North Chicago Rolling Mill Company, the Joliet Steel Company and the Union Steel Company. It is understood that the arrangements have been practically carried out, and that the details are now being arranged, the plan being ready to be submitted to the stockholders of the three companies for their approval. It is reported that the capital is to be \$25,000,000, \$5,000,000 to be paid in cash for working capital, and to provide for a number of improvements, including erection of Plate mills, &c.

Wire Rods.—There has been some business in Foreign Rods at \$41.50.

Old Rails.—The market is dull, with light supplies and a moderate demand. We quote nominally \$23 @ \$23.50.

Serap Iron.—There is a fairly good demand, and prices are steady at about the following prices for cargo lots: No. 1 Scrap, \$20 @ \$21, delivered on boat; Turnings, \$13 @ \$14, do; Cast Scrap, \$15.50 @ \$16, do; Cast Borings, \$10; Horseshoes, \$23 @ \$24; Coil and Leaf Steel, \$20, to boat.

Track Fastenings.—We quote Spikes \$2, delivered; Angle Bars, 1.75¢ @ 1.80¢, and Nuts, 2.65¢ @ 2.75¢.

Financial.

Fine weather has a cheering influence, but a serious crisis in Paris, troubles among iron manufacturers, depressions in the coal market, lower prices for wheat, all had an unsettling tendency, and the inauguration ceremonies served to distract attention in business circles. Nevertheless, traffic is heavy contrasted with the entire suspension during the "blizzard week" one year ago, and among New York dry goods jobbers there is a firm tone, attended with a healthy condition both as to supply and demand. Respecting the volume of trade in the country at large, the aggregate clearing house returns of all leading cities for three weeks past indicate a gradual decline compared with the same time last year. Even with this abatement there was an increase of 13.3% during the week ended March 9, and there was a like increase both in and outside of New York. Boston increased 10.5; Philadelphia, 23.9; Chicago, 23; St. Louis, 10.1; San Francisco, 7.5; Baltimore, 13.1; Pittsburgh, 10; Cincinnati, 23.4; Louisville, 24.8; Kansas City, 20.5; Milwaukee, 16.1; Denver, 47.7; Detroit, 15.7; St. Paul, 22; Minneapolis, 27.1; Omaha, 41.1; Cleveland, 23; Richmond, 34; Duluth, 83.6; St. Joe, 28. Stagnation at several points in the Northwest is ascribed to the light wheat crop and unusually mild winter. Governor Merriam, at St. Paul, says: "I look for a quiet business year. The great decrease in building railroads has cut off a tremendous amount of business all over the country. There has not only been a reduced traffic on railroads, but with it a decreased amount of general business. With decreased earnings comes the discharge of employees, and the large number of laboring men out of employment naturally affects the community at large. In addition to this, in Minnesota we were very unfortunate in losing a large portion of the wheat crop, and the State is much poorer than a year ago at this time. The effect of the loss is necessarily felt in all commercial circles." In various directions satisfaction is expressed that the Interstate Commerce Commission has begun to assert its powers under the recent amendments to the law. A meeting will be held at Chicago to-morrow to consider export rates. Business failures in the United States last week numbered 241, against 195 a year ago.

The Stock Exchange markets were irregular, and in several instances there were important declines, influenced chiefly by foreign advices. On Thursday there was no special feature, dullness prevailing. On Friday the market was chiefly affected by the cutting of rates by roads in the Northwest and by depression in the iron trade, resulting from the collapse of the Reading Iron Company. On Saturday the market was sold down after the receipt of news of a panic on the Paris Bourse, the result of a heavy decline in Comptoir d'Escompte and Métaux shares. The bears proceeded to attack the general list. St. Paul, Reading, Union Pacific and Lackawanna all declined heavily. The theory of the bears was that the panic in Paris would directly affect speculation in copper shares and possibly prevent the success of the English syndicate interested in this metal. It was also suggested that gold might have to be exported. On Monday there was an improved tone at the close, after free selling to realize and a renewal of bear pressures. Solitude was expressed concerning the anthracite shares, the measures of relief possible seeming to be limited either to a reduction of prices or a lessened output of mineral. On Tuesday the market was

dull but prices were steady. The news from the West was contradictory, one report saying that Mr. Walker would not and another that he would accept the position tendered him. The reduced prices for coal officially announced had no effect.

Government bonds are quoted as follows:

U. S. 4½s, 1891, registered.....	108
U. S. 4½s, 1891, coupon.....	107½
U. S. 4s, 1907, registered.....	128½
U. S. 4s, 1907, coupon.....	129½
U. S. currency 6s.....	120

The nomination of George C. Tichenor, of Illinois, to take the place of Judge I. H. Maynard as Assistant Secretary of the Treasury, is favorably received. Mr. Tichenor has been a special agent of the Treasury Department since 1878, during which time he has made a special study of customs methods with reference to under-valuations and other alleged irregularities. This is the first time for at least 20 years that an expert in customs laws and regulations has been appointed to this position.

The weekly statement of the New York banks showed a decrease of \$3,722,250 in surplus reserve, which now stands \$8,545,860, against \$11,487,300 on March 10, 1888, and \$7,998,350 on March 12, 1887. The increase in loans of \$4,069,100 was not unexpected. The currency movement was against this city, the West drawing freely, and Sub-Treasury operations resulted in a loss. Specie decreased \$3,290,400, showing the effect of the interior movement; and legal tenders decreased \$262,900. Deposits increased \$675,800. The quarterly statement of the condition of New York City national banks again makes a very favorable showing. The aggregate loans and discounts are reported at \$308,520,600, in comparison with \$284,076,200 at the date of the last reports.

The money market was more active, with a good inquiry and comparatively few lenders. Offerings were confined to trust companies and institutions other than banks. Commercial paper is less sought for, as the banks generally have filled up with this line, and the supply is only fair. Rates are 4½% for 60 to 90 day indorsed bills receivable and 4½ to 5½ for four months' acceptances. The Washington Trust Company of the city of New York have been incorporated, with a capital stock of \$500,000. Ex-Assistant Treasurer Charles J. Canda and Solicitor of the Treasury Alexander McCue are members of the company. The New York Chamber of Commerce recommends the repeal of the Saturday half-holiday law, despite the fact that the chamber favored the measure at the time of its enactment. It is intimated from Washington that Secretary Windom will make no immediate change in the policy of the Treasury. The total amount of bonds purchased to date under the circular of April 17 is \$124,558,550, of which \$51,337,300 were 4 per cents and \$73,221,250 were 4½ per cents. The cost of these bonds was \$145,231,588, of which \$65,925,899 was paid for the 4 per cents and \$79,305,689 was paid for the 4½ per cents.

In view of the recent amendment of the Interstate Commerce act authorizing the commission to direct when joint tariffs shall be made public, the commission has ordered that all advances and reductions in joint rates, fares and charges shown upon joint tariffs established by common carriers subject to the provisions of the act to regulate commerce shall be distinctly scheduled and be conspicuously posted ten days prior to the taking effect of any such advance, and three days prior to any such reduction. Each of the railway carriers comprising the Trunk Line Association is notified to appear before the Interstate Commerce Commission in Washington on Saturday next, for the purpose of fully setting forth and showing

what their export rates are and how these export rates are made by each of the companies, and also for the purpose of giving each of the carriers an opportunity to be heard.

The imports of merchandise at this port during the week were valued at \$11,761,000, of which \$4,000,000 represents dry goods. Since January 1 the aggregate is \$101,617,000, against \$98,870,000 for the same time last year and \$90,802,000 in 1887. Exports were \$7,698,595, making the total since January 1 \$69,067,000, against \$59,520,700 last year.

Exports of specie from this port last week amounted to \$556,000. Total since January 1 \$6,373,000, as compared with \$5,443,000 last year. The imports were \$186,000.

Metal Market.

Copper.—The demoralization and excitement in everything connected with Copper on the Paris exchange, reflected in London in the decline both in the metal itself and in shares, at one time carried the spot price in latter city from £64 a week ago to £47 early in the week, and futures from £64 to £51. It was stated that for a moment £46 was reached for spot. Then, however, the reaction set in and yesterday there was an improvement to £58, spot, in order to close at £56, futures having recovered to £52. Comptoir d'Escompte shares closed at Paris at 385 francs, and those of the Société des Métaux, after rebounding to 150 francs, again closed at 117.50, while Rio Tinto wound up at 341.25. It was furthermore called from Paris that the Rothschilds and Barings were in negotiation with the syndicate to assume its holdings at a reasonable figure. It was subsequently cabled that the arrangements which the Société des Métaux was trying to effect with the Copper mines to prolong to 12 years the present contract, had fallen through. While every disposition was shown by the Bank of France to come to the assistance of the syndicate, and while similar efforts were made by certain London banking concerns to help bridging over its financial difficulties, a somewhat improved feeling was fostered, and there was added a readiness on the part of mining companies to carry their output for the next two months, thus opening the prospect of some substantial relief. Henry R. Merten & Co. make the stock of Copper in England and France and afloat theroeto from Chili and Australia as follows: February 28, 1889, 218,140 tons; January 31, 1889, 109,528 tons; December 31, 1888, 101,105 tons; February 29, 1888, 52,593 tons; February 28, 1887, 59,546 tons; January 1, 1888, the visible supply in England, France and the United States was 54,098 tons, and on December 31, 1888, 151,995 tons. London dispatches reported that 8000 tons of Copper Matte were sold from London yesterday to Germany at 10½ @ 11 ½ per unit, or a little over 10¢ per lb, and that 12 ¼ per unit is now bid. It was also reported that 1000 tons of Bars were sold at £57. Some little speculative trading has meanwhile been done on our Metal Exchange in good merchantable, whereof 56,000 lb April were sold at from 15¢ down to 14.60¢; 140,000 lb May at 14.35 @ 13.50; 28,000 lb June at 14¢; and 28,000 lb July 13.18¢, while Lake was offered at 16.30¢, spot, 16.10¢ March, and 15.50¢ April. Subsequently 140,000 lb good merchantable were sold at 12.75¢ @ 12.90¢ for May and 25,000 lb Lake at 16¢. During the first few days of the week 1200 tons changed hands in London. To-day, with the advance there lost again, Lake closes at 15¢ @ 16¢, spot, nominally.

Tin.—Tin declined from £94. 17/6 a week ago to £94. 12/6 yesterday, for spot, futures giving way from £95. 15/ to £95.

7/6; sales reaching 350 tons in the London market. We have been steady here, with a moderate business doing, 20 tons March at first selling at 21.30¢, but subsequently easing off somewhat, March and April ranging between 21.15¢ and 21.30¢, and May at 21.25¢ @ 21.40¢. Later on, a better feeling obtaining, spot brought 21.25¢ @ 21.50¢; Tin closer steady this morning at 21½¢ @ 21½¢, spot. *Tin Plates.*—While the English market has continued exhibiting great firmness, with an upward tendency for forward delivery, the market here has developed no new features of an encouraging nature, the sentiment still being one of flatness and indifference. The following are the closing quotations in large lines $\frac{1}{2}$ box: Liverpool quotes Coke 13/ @ 13/3; Siemens-Martin Steel, Charcoal Finish, \$4.75 @ \$5.50; Ternes, \$4.12 @ \$4.25; Coke Tins, \$4.22½ @ \$4.30, and Wasters \$4.12½ @ \$4.15.

Lead.—Sales have not exceeded 400 tons at 3.75¢ for Common Domestic, with no buyers toward the close at over 3.75¢, 3.80¢ being asked. St. Louis remains steady at 3.45¢ @ 3.50¢.

Spelter—Has been rather sparingly offered, yet in the absence of an active local demand there has been continued flatness, with prices indifferently well sustained at 4.80¢ for Common Domestic, and Silesian, nominally, 5¢.

Antimony.—A light trade has prevailed at 12¢ for Hallett and 13½¢ for Cookson.

New York Metal Exchange.

The following sales are reported:

THURSDAY, March 7.

25,000 pounds Lake Copper, March.....	15.75¢
28,000 pounds G. M. Copper, April.....	15.00¢
28,000 pounds G. M. Copper, May.....	14.35¢
28,000 pounds G. M. Copper, June.....	14.0¢
28,000 pounds G. M. Copper, July.....	13.80¢

FRIDAY, March 8.

28,000 pounds G. M. Copper, April.....	14.60¢
112,000 pounds G. M. Copper, May.....	13.50¢
16 tons Lead, June.....	3.80¢
96 tons Lead, April.....	3.80¢

MONDAY, March 11.

28,000 pounds G. M. Copper, May.....	12.90¢
112,000 pounds G. M. Copper, May.....	12.75¢

TUESDAY, March 12.

10 tons Tin, May.....	21.20¢
25,000 pounds Lake Copper, spot.....	16.00¢

WEDNESDAY, March 13.

28,000 pounds G. M. Copper, March.....	13.75¢
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Coal Market.

The Coal trade awaited with anxiety a meeting held on Monday to fix the spring opening prices. It is understood that there was a sharp divergence of opinion, a number of those present holding that a reduction would only weaken the market. The final action was the adoption of a scale 10¢ to 15¢ below those of the spring of 1888, as follows, to take effect immediately: Broken, \$3.75; Egg, \$3.90; Stove, \$4.15; Chestnut, \$4. The opening prices for the spring months for four years compare as follows:

	1886.	1887.	1888.	1889.
Grate.....	\$2.85	\$3.55	\$3.75	\$3.75
Egg.....	2.85	3.80	4.00	3.90
Stove.....	3.25	4.15	4.25	4.15
Chestnut.....	3.00	4.00	4.25	4.00

The reduction compared with winter prices made last December for White Ash is, on Grate, 20¢; Egg, 40¢; Stove, 50¢; Chestnut, 65¢. Compared with spring prices for 1887, the changes are much less striking, amounting only to 10¢ @ 20¢ on the larger sizes. Bituminous Coal prices are fixed at \$2.60 $\frac{1}{2}$ ton, f.o.b. at tidewater, the same as last year. No arrangement has yet been made with the Beech Creek interest, from which fact it is argued in some quarters that the so-called "pool" must become inoperative. No definite contracts are announced, but report says that in several instances a number have been secured by Clearfield and

Cumberland parties. Production at all the mines for the week ended March 9 was 485,752 tons, an increase of about 8000 tons compared with the previous week, but a decrease of nearly 200,000 compared with the same week in 1888. Since January 1 the aggregate is 5,285,000, against 5,961,000 for the same time in 1888.

Regardless of the new prices, Stove Coal afloat is selling by individuals at \$4 @ \$4.10, and Chestnut, \$3.90 @ \$4.10. Lehigh, otherwise hard Coal, prices were made on Wednesday, too late for this publication.

Imports.

Hardware, Machinery, &c.

Boker, Hermann & Co., Hwd., pkgs., 11; Arms, cs., 50
Clark, G. A. & Bro., Mach'y, cs., 180
Curley J. & Bro., Cutlery, cs., 2
Dolge, Alf., Mdse., cs., 5
Field, Alfred & Co., Mdse., pkgs., 6
Graef Cutlery Company, Cutlery, cs., 8
Hiller's Son, R., Hwd., bales, 20
James, Emil, Sewing Machines, cs., 57
Kastor, Ad., Mdse., cs., 9
King, Hezekiah, Mdse., cs., 2
Lundborg, Capt., Steel Wares, bxs., 10
Peck & Vensor, Hwd., bales, 10
Schoverling, A., Arms, cs., 22
Sheldon & Co., G. W., Arms, cs., 9
Swarzenbach, Haber & Co., Mach'y, cs., 12
Wiebusch & Hilger, Lim., Razor Hones, cs., 14;
Mdse., cs., 27; Anvils, 40; Hwd., pkgs., 9
Order, Mach'y, cs., 2; do, pkgs., 245; Hwd., pkgs., 25

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, March 13, 1889.

The Copper market has been very unsettled, responding more or less to various statements and rumors. The most favorable announcement, and one upon which sufficient confidence centered to cause prices to advance to £58 for prompts, was that identifying the Matheson Company, of London, with recent negotiations. At the request of representatives of the syndicate, this firm, it is said, has undertaken the sale of the entire stock now under syndicate control. It is understood that a limit on price has been fixed, but, further than that the figures shall not be below the original cost to the syndicate, no information on this point is given. It is semi-officially announced that, in order to facilitate matters, the existing contracts with the mines have been modified, all companies giving assent to a restriction of production. The extent of the curtailment is not stated, but competent authorities express the belief that the plans are sound as a means of restoring affairs to a more normal basis. The machinery, it is understood, will be under the control of the Mathesons.

Interviews with the Rothschilds, Merton, Strauss and others of prominence, on Tuesday, elicited the opinion in those quarters that under the new arrangement the syndicate would be able to steady the market at prices that would likely bring consumers in. This led to prompt selling up to £55. 10/ @ £56 at the close of business on Tuesday. The market opened weak and unsettled to-day (Wednesday), however, with free offers of prompts at from £53 down to £48, futures as low as £46, and comparatively few buyers of either. Best Selected English Copper has dropped to £60, sellers, with sales light and no improvement apparent in the demand.

With respect to the announcement that some 8000 tons Matte have been sold at

11/ $\frac{1}{2}$ unit, for Germany, I learn, upon investigation, that it correctly represents facts. About 1000 tons of Bars have been sold during the week at £57, also to go to Germany. The market for shares, while still unsettled, is showing greater firmness.

Block Tin has been somewhat adversely affected by the movements of prices of Copper, these having influenced speculative sentiment in some degree, although leading to no forced selling. Under almost complete neglect the price for Straits declined to £94, but quickly recovered, in sympathy with the better turn in Copper, and touched £94. 15/.

Holders of Pig Iron warrants have been realizing freely on this week's advance and the "bears" have sold largely again the last few days. Makers' brands are strong at a further advance, the Continent and Canada being good customers. There is practically no demand from America. The exports to the States during February were about 7000 tons. The make of Hematites has been lessened considerably owing to strikes that forced the damping of nine furnaces. Others are, however, likely to be relighted.

The demand for Tin Plate has improved, particularly from the States, with prices about the same as those offered last week. The question of the formation of an American syndicate to purchase works is being discussed at Swansea, but nothing definite on the subject can be learned. The exports to the States during February were 28,000 tons, against 22,000 tons the corresponding month last year.

Large sales recently are reported of Old Iron Rails for Italy. The prices are not stated, but understood to be below those generally asked by holders.

The demand for Steel of nearly all descriptions, as well as for Iron, is something enormous, and prices still show a rising tendency in all sections. Requirements for consumption and export alone necessitate heavy purchases, but some impetus to operations is given by suggestions of other syndicates in the trade than the one now under way to control Steel Rails.

The fluctuations in prices during the week include 6d to 2/8 rise on Scotch Pigs, 3d on Cleveland Pigs, 6d on Hematites, 1/3 on Steel Rails and Billets, 2/6 on Steel Slabs, 6d on Steel Blooms and 3d on Bessemer and Siemens Steel Tin Plate.

Scotch Pig.—Business has continued active, and prices are again higher nearly all through.

No. 1 Coitness, f.o.b. Glasgow.....	55/6
No. 1 Summerlee, " " ".....	54/6
No. 1 Gartsherrie, " " ".....	51/3
No. 1 Langloan, " " ".....	53/6
No. 1 Carnbroe, " " ".....	46/3
No. 1 Shotts, " at Leith.....	58/6
No. 1 Glengarnock, " Ardrossan.....	50/6
No. 1 Dalmenyton, " " ".....	45/8
No. 1 Eglinton, " " ".....	44/6

Steamer freights, Glasgow to New York, 5/

Liverpool to New York, 10/.

Cleveland Pig.—There is still a brisk trade, and the market continues strong. No. 1 Middlesboro', G.M.B., 39/6; No. 3 ditto, 37/.

Bessemer Pig.—Transactions have been large, and the market is strong at a further advance. West Coast brands, mixed numbers, 47/9 @ 48/, f.o.b. shipping point.

Spiegeleisen.—A fairly active business, but no change in prices. English 20% quoted 80/, f.o.b. N.W. England shipping point.

Steel Rails.—The demand has continued active, and prices have again advanced. Heavy sections quoted at £4. 7/6, and light sections £4. 15/ @ £4. 17/6, f.o.b. at N. W. England shipping point.

Steel Blooms.—The market more active and very firm. We quote £3. 19/3 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—There is a fair business and prices are very strong. Bessemer, 2½ x 2½ inch, £4. 6/3, f.o.b. at N. W. England shipping point.

Steel Slabs.—Not much doing in these, but prices are higher and firmer. Bessemer, £4. 1/3, f.o.b. at N. W. England shipping point.

Old Rails.—Prices without quotable change. Tees quoted at £3. 5/ @ £3. 6/; and Double Heads, £3. 8/ @ £3. 10/ c.i.f., New York.

Scrap Iron.—The market remains steady and quiet. Heavy Wrought quoted at £2. 2/6 @ £2. 7/6, f.o.b.

Crop Ends.—Very little doing, but sellers firm on prices. Bessemer quoted £2. 10/ @ £2. 12/6, f.o.b.

Tin Plate.—Trade been large in Steels and the market is very firm. We quote, f.o.b. Liverpool:

1C Charcoal, Allaway grade.....	15/3 @ 15/9
1C Bessemer Steel, Coke finish.....	13/9 @ 14/
1C Siemens ".....	14/ @ 14/3
1C Coke, B. V. grade.....	13/ @ 13/3
Charcoal Terne, Dean grade.....	12/6 @ 13/

Manufactured Iron.—Business in this department continues brisk and at firm prices. We quote, f.o.b. Liverpool:

	£ s. d.	£ s. d.
Staff. Ord. Marked Bars.....	8	2 6
" Common ".....	5 12 6	5 15 0
Staff. Bl'k Sheet, singles.....	7 12 6	8 10 0
Welsh Bars (f.o.b. Wales).....	5 2 6	5 5 0

Copper.—The quoted prices at the close were: Bars, £50 @ £51 for spot; £47 @ £48 for three months futures. Best Selected, £60 nominal.

Tin.—A quiet market, with but little change in prices. Straits quoted at £94. 12/6, spot, and £95. 7/6 for three months' futures.

Lead.—Trade fair at slightly easier prices. Quoted at £12. 12/6 for Soft Spanish.

Spelter.—The demand moderate; prices rather weak. Quoted at £17. 2/6 for ordinary Silesian.

Foreign Markets.

EQUIVALENTS.

Franc, Peseta or Lira.....	19.3
Florin (Netherlands).....	40.2
Florin (Austria).....	35.9
Milreis (Portugal).....	1.08
Milreis (Brazil).....	54.6
Mark (Germany).....	23.8
Pounds.....	2.205
Kilogram.....	1.34
Picul.....	

EAST INDIES.

COLOMBO, January 24, 1889.—Plumbago.—A steady business has been transacted at following rates in rupees per ton: Large lumps, 145 @ 170; ordinary lumps, 125 @ 160; chips, 80 @ 95 and dust 40 @ 65. **Coir Yarn.**—Sales have been made at 7 @ 12 rupees $\frac{1}{2}$ cwt. for No. 1 to No. 4. Since October 1 there have been shipped 22,500 cwt. of Plumbago to England, 1250 to Hamburg, 1801 to Antwerp, 456 to Bremen, 21 to India, 88 to Australia and 35,038 to the United States—together, 61,163, against 95,522 in 1888, 82,198 in 1887 and 62,533 in 1886. **Exchange.**—Six months' sight, 1/4 1/4d.—*Volkart Brothers, through their agent, Mr. T. W. Greene, 82 Wall street, New York.*

SINGAPORE, January 28, 1889.—Tin.—An active business has been done during the fortnight, Chinese dealers having as usual pushed forward supplies in advance of the Chinese

New Year holidays. Very large supplies have come in which have been steadily taken for Europe at \$87 down to \$86.50 $\frac{1}{2}$ picul. February will bring in only small quantities, but steamers now loading and clearing will have large shipments during the first half of February. **Gum Copal.**—Has a fair demand; sales have been made at \$10.87 $\frac{1}{2}$ down to \$7.55, according to quality. **Gum Dammer.**—Small supplies have come in and have brought \$19.25 @ \$20.25 for Palembang and \$16 for Banjar. **Exchange** is steady at 3 1/4d six months' sight. During the month the steamer Deucalion took 84 piculs to San Francisco and the steamer Yorkshire 1682 for New York.—*Giffilan, Wood & Co.*

SINGAPORE, March 4, 1889.—Tin.—There were shipped from the Straits Settlements to the United States in February 800 tons, against 250 same month last year, and to England 2750, against 2500. Total shipments during first two months to America 1350 tons, against 650 last year, and to England 3950, against 6000.—*Giffilan, Wood & Co., per cable direct to Mr. Charles Nordhaus, New York.*

MANILA, March 4, 1889.—Hemp.—There are buyers at \$16.75 $\frac{1}{2}$ picul, against \$8.25 same date last year, equaling $\frac{1}{2}$ ton, cost and freight, \$56.12/6, against \$29.15. Since last cable the clearances for the United States amounted to 15,000 bales, against 20,000 last year; since January 1 to 75,000, against 39,000. There remain main loading for ditto 25,000, against 3000. Cleared for England since January 1, 59,000, against 42,000; loading for ditto 5000, against 17,000. Cleared for all other ports 7000, against 11,000. Receipts at all ports since last cable 14,000, against 21,000; and since January 1, 119,000, against 103,000 last year and 75,000 in 1887. **Freight.**—\$7.50, against \$5. **Exchange**, 6 months' sight, 3/8, against 3/8 1/2.—*Kerr & Co., per cable direct to Mr. Charles Nordhaus, New York.*

PENANG, January 22, 1889.—Tin.—Receipts during the fortnight aggregated 13,000 piculs, while the sales amounted to 10,600 piculs taken by Europeans and 5000 piculs by Chinese. The market opened at \$36.85 $\frac{1}{2}$ picul, subsequently rising to \$37.05, but closing at \$36.52 1/2. There were exported since the beginning of the month only 1057 to England and nothing to America. **Gum Benjamin.**—No. 1 has been bringing \$34 to \$69, and No. 2 \$30 to \$50. **India Rubber** may be quoted \$69.50. **Exchange** 3 1/4d.—*Schmidt, Kusterman & Co.*

GERMANY.

HAMBURG, March 2, 1889.—Iron.—The statistical position of Pig Iron continues favorable. The demand is still on the increase, especially for Spiegel, the stock of which is steadily decreasing, while the inquiry is brisker both for home use and export. Nothing can be had now for less than 63 marks $\frac{1}{2}$ ton. Rolling mills are compelled to lay in larger and larger amounts of Forge Pig, the tendency remaining upward. The quotation is now 53 @ 54 marks. Foundry Pig has gone on moving off steadily at 54 @ 61, while Thomas is in active request at 46. Bessemer is neglected. The rolling mills are all fully booked for domestic account, little being done for export. There is hardly a branch in the Finished-Iron line that does not exhibit signs of buoyancy. Boiler Plates have been advanced 5 marks $\frac{1}{2}$ ton, and this will soon be done with Thin Sheets. The Wire branch is slowly looking up likewise. Machine shops, foundries and car works all continue reporting favorably. We quote Wire Rods 116 @ 118; Steel Rails, 120 @ 128, and do. for mines, 110 @ 115.—*Borsenhalle.*

BELGIUM.

BRUSSELS, March 2, 1889.—Iron.—The Belgium Iron market, under a steady, good demand, has been firmly sustained during the week; prices obtained by makers leave them a good margin, while being readily subscribed to by consumers. Our machine shops and foundries are receiving handsome foreign orders, among others a large one for Constantinople for Cast-Iron Gas-Pipes. The last adjudication of Steel Rails left Belgian makers 119 francs $\frac{1}{2}$ ton at the works. In 1888 the production of domestic Pig Iron in Belgium was 826,984 tons, as compared with 755,781 in 1887. Iron production amounted to 548,055 tons, against 534,056, and Steel was turned out to the amount of 223,638 tons of Ingots, against 216,186 the previous year, and 188,588 tons of Rails and Sheets, against 191,445 in 1887.—*Moniteur des Intérêts Matériels.*

The 8-inch gun shields for the steel cruisers Boston and Atlanta have arrived at the Brooklyn Navy Yard. When they were fitted to the guns on the Boston it was found that the apertures were entirely too small, and they will have to be enlarged. The shields were made at the

Government ordnance foundry in Washington, and are the first as yet turned out for 8-inch rifles. They differ considerably from those fitted to the 6-inch guns, and notably in the feature of a hood which protects the gun's crew from a fire from aloft. The general shape of the forward end of the shield is the same as that for the 6-inch rifles—namely, slanting. The hood, however, is the distinguishing peculiarity, and what with the protection afforded from a fire from forward and a fire from overhead, the gunners are pretty well screened from small-arm and machine-gun fire. So long as the gun is kept pointed toward the enemy the shield will afford protection, but not otherwise. The necessary alterations, it is expected, will be made in the machine shops in the Brooklyn Navy Yard.

Large Steel Output.—The output of steel at the Edgar Thomson Steel Works during two days just past, 9th and 10th insts., is claimed to beat the world's record. The first turn on Friday made 45 heats in eight hours, turning out 462 tons and 410 pounds of steel. On the same day No. 2 turn, in 12 hours, made 67 heats, and the amount of steel produced was within 50 pounds of 698 tons. Saturday the first turn in 12 hours made the unprecedented record of 71 heats. The amount of steel in this enormous output was 720 tons. The third turn made 30 heats, which, when counted into tons of steel, reckons but little less than 316.

The Denver and Rio Grande Western Railroad Company have placed with the North Chicago Rolling Mill an order for the first lot of heavy steel rails, in furtherance of the plan to widen their gauge and furnish a neutral connection from Colorado to Salt Lake City and Ogden free, on equal terms to all lines east and west of the Rocky Mountains, and of a uniform gauge with them.

The total weight of the gunboat Yorktown's propelling machinery is 320 tons, and as the horse-power developed is in the neighborhood of 3550, the unusual proportion of 11 horse-power to the ton weight has been secured.

We have just learned that the Columbia Rolling Mill Company have disposed of a half interest in their business to Drexel, Morgan & Co., bankers, and are about putting down additional machinery at their mill in Jersey City and preparing to largely extend. The officers of the company now are: W. L. Brockway, vice-president, and G. W. Knight, treasurer, Jesse Larrabee still holding the presidency.

Stevens & Arnold, contractors, are about to put into the Tilly Foster Mine, at Brewster, N. Y., a large size Brennan crusher having a capacity of 300 tons per 10 hours.

The puddlers of the Maiden Creek Iron Company, at Blandon, Pa., have accepted a reduction in wages from \$3.50 to \$3.25 per ton, and all other employees have been reduced in proportion, and the mill is running with its 175 hands in employment as usual. Puddlers in nearly all the mills in that section have been reduced 25 cents per ton, and have accepted the same.

The boiler shop of the Gray's Ferry Foundry and Boiler Company, Limited, of which Daniel L. Lawson is president, was destroyed by fire on Tuesday evening, involving a loss of \$6000. The flames originated in the core shop.

Hardware.

Goods continue moving in fair volume, but trade is perhaps a little disappointing, as orders do not cover the quantity of goods anticipated by some who have been expecting an exceptionally active trade. While there is thus some complaint, there is little reason to doubt that the amount of business compares well with other years, and, with the advance of the season, it is expected that a very satisfactory trade will be done. Prices are without material change and collections fair.

Barb Wire.

The New York market shows more signs of activity, and prices are steadily maintained on a basis of 3.5 cents for carload lots Galvanized Four-Point, with the usual deliveries. Small lots are held at 3.8 cents, and 3-ton lots at 3.6 cents.

Washburn & Moen Mfg. Company, Worcester, Mass., and I. L. Ellwood & Co., De Kalb, Ill., issue a joint circular dated Chicago, February 28, addressed to dealers in and consumers of Barbed Wire, in which they call attention to the litigation in regard to Barbed Wire patents and their action against infringers. They allude especially to their suits against the Braddock Wire Company and the St. Louis Wire Mill Company, and their efforts to bring the same to trial.

The Iowa Barb Wire Company, 93 Read street, are putting on the market a line of Barb Wire with a new barb, to which they refer as follows:

It is apparent that the tensile strength of Barb Wire is not affected by the size of Wire used for the barbs, and that if a lighter barb will answer equally well the saving in weight is clear gain to the consumer. To this end, we now make a Two-Point Barb Wire which we call the "Texas barb." The barb will be flattened nearly one-half, thereby saving one-third the weight of the barb, or about 10 per cent. of the total weight of the Barbed Wire. Our price for this Wire will be 10 cents per 100 pounds, extra, which represents about one-third of the gain to the consumer in weight as compared with other barbs.

Wire Nails.

There is a fair demand for Wire Nails, and prices are without material change. In some cases, however, slight concessions have been made indicating that the market has not yet the strength which it has been hoped would characterize it. Quotations are on the basis of about \$2.25 to \$2.30 for carload lots at factory.

Cut Nails.

There has again been some irregularity, due chiefly to offerings at a low price of a lot of Nails which, it is claimed, were rejected recently by a railroad company. Otherwise the movement is quite satisfactory in volume, considering the season. We quote: Iron Nails in carload lots on dock \$1.80 @ \$1.85, and small lots \$1.90 @ \$1.95.

The Demand for Cheap Goods.

We print below a significant and suggestive communication, which comes from a gentleman occupying an influential position among Hardware manufacturers, whose very extensive familiarity with the trade in all parts of the country, as well as his knowledge of business methods in Europe, give to his views an especial weight. It will be seen that he refers to the demand, on the part of the jobbers especially, for low-priced goods without much regard to their quality, and regards this as one of the mischievous features of the trade, for which he proposes a somewhat radical

remedy, suggesting not only the wisdom of manufacturers in seeking to establish direct relations with the retailers, but also the organizing of something in the way of a manufacturers' syndicate, with headquarters in the leading Hardware centers:

The great fault of the American buyer, especially in the Western market—referring more particularly to that section of the country between the Alleghanies and the Rockies—is that they will not consider quality. If a manufacturer goes to them with an Auger Bit, a Plane Iron or any other leading line of Hardware which is made by a number of different manufacturers, the invariable response of the buyer to the manufacturer is: "Oh, a Shovel is a Shovel, and a Chisel is a Chisel, and you see our trade don't care; it is a matter of price. You may see some advantages in your quality, and it may be a little better, but you make us pay for the difference and the trade won't stand it. A farmer comes in and calls for a Pitchfork and nine times out of ten he will take the cheapest one." So in vain the manufacturer pleads that his goods contain stock that costs him more than his neighbor, that he finishes them more highly than his competitor, that he is more careful in the inspection and details of his business, and that his goods actually cost more. The buyer turns him off and will not take his goods, and the manufacturer goes away despondent because he cannot compete with his low-price neighbor. The only course for the manufacturer is to consult his own interest and place himself in closer connection with the small trade, selling to them at what would be a low price and yet net the manufacturer a little profit which would otherwise be swallowed up by the jobber. The foreign merchant is different. He is willing to stand by an old-established house and handle the article which he knows to be first class in every respect, and so represent it to his customers, and he is more willing and more apt to pay a fair price.

We believe the policy of the manufacturers in this country should be to place their own houses in the principal buying sections of the West—say, Chicago, St. Louis, Kansas City and St. Paul; and if necessary where the manufacturer has only a limited trade let several of them pool their interests at various points and sell their goods through this syndicate, hiring their own stores, salesmen, clerks and travelers, and charging up the expenses according to the business done by each house. It might be expensive at first, but it would pay in the long run, for the manufacturer would have his goods introduced and a call established for them, and not place himself at the mercy of some large jobber who would buy one large bill of him and the next month turn round and buy of some competitor if he could make 2½ per cent. by so doing. Our own belief is that the retailer and the manufacturer are coming more closely together every year, and the manufacturer who caters most closely for the retail dealers' trade is the one who will win in the long run, for he is working for his own interest, finding and meeting the wants of his trade. These the jobbers are prone to cover up and make the manufacturer believe his goods are not suited to the market, when the simple truth is they can make more money by handling some other line, and the manufacturer goes away with the idea that his Plows and Shovels are unsuited to the particular market in which he has been trying to sell them, and it would be too much expense to alter his styles. In many ways we can see from a manufacturer's standpoint how he is often hoodwinked out of the trade which he could otherwise cater to and handle nicely.

Miscellaneous Prices.

The following are the list prices of the Never Break Spiders, which are put on the market as the beginning of a line of Stamped Steel Hollow-Ware by the Bronson Supply Company, Cleveland, Ohio. The list is subject to a discount of 50 per cent.:

No.	Diam. of Bot'm. Inch.	List.
7.	8	\$0.65
8.	9	.75
9.	10	.90
10.	11	1.10
12.	12	1.30

The following is the price list of D. W. Bosley & Co., Chicago, Ill., for their Rubber Floor Scrubbers and their Bar and Counter Cleaners, and is subject to a discount of 50 per cent.:

Rubber Floor Scrubber.

No. 1.—Ash Block, 1½ inch; Rubber ¼ inch thick. Ash Handles, 4½ feet long.	
No. 1, Heavy, Pure Rubber, per dozen.—12-inch, \$8; 14-inch, \$9; 16-inch, \$10; 18-inch, \$11.	
No. 2.—Ash Block, ½ inch; Rubber 3-16 inch thick. Ash Handles, 4½ feet long.	
No. 2, Light, Pure Rubber, per dozen.—12-inch, \$5; 14-inch, \$6; 16-inch, \$7.	

Rubber Bar and Counter Cleaner.

Imitation Walnut, Oil Finish, Block ¼ inch; Rubber 3-16 inch thick, per dozen.—12-inch, \$3.50; 14-inch, \$3.75; 16-inch, \$4.	
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The Peerless Rubber Window Cleaner is sold from the following list, which, in gross lots, is subject to a discount of 60 per cent.:

8-inch, per doz. \$4.20	14-inch, per doz. \$6.00
10-inch, per doz. 4.80	16-inch, per doz. 7.50
12-inch, per doz. 5.40	18-inch, per doz. 9.00

The manufacturers of Common Carriage Bolts were in convention last week, and the question as to the feasibility of advancing prices, as well as other matters connected with the organization, received careful attention. It was not deemed advisable to make any change in prices, but action was taken which it is thought puts the combination in a still better position than heretofore.

Humason & Beckley Mfg. Company, New Britain, Conn., and 80 Chambers street, New York, issue the following revised discount sheet applying to their catalogue, January 1, 1888:

Page.	Dis. per cent.
4-10. Hammers.	40
10. Tack Claws.	50
11. Nail Sets.	50&10
11. Screw Drivers.	60&10
11. Screw-Driven Bits.	40&10
12. Saw Sets.	20&10
12. Belt Punches.	40
13. Pliers.	50
13. Box Chisels.	60
13. Butter and Cheese Tryers.	25
14. Bolts.	70&10
14. Malleable Hooks and Eyes.	76
15. Rail Screws.	70&10
16-22. Bright Wire Goods.	87½
23. Meat Hooks, Wire.	80&25
24, 25. Meat Hooks, Wrought.	80&25
26. Staples, and Hooks with Staples.	80&25
27, 28. Hasps and Hasps and Hooks, with Staples.	80&25
28, 29. Rings and Rings with Staples.	80&25
29. Awning Hooks.	80&25
30. Bow Pins.	60&10
31. Cattle Leaders.	70
31. Bull Rings.	70&10
31. Bull Punches.	25
32. Box Hooks.	50&10
33. Cotton Hooks.	50&10
33. Hay Hooks.	50&10
33. Box Scrapers.	40&10
34. Nut Crackers.	40
35. Champagne Openers.	40
35. Can Openers.	50
35. Key Rings.	40
35. Hoof Cleaners.	20
36-51. Cork Screws.	40
52-95. Pocket Cutlery.	33½
96. Tuning Forks.	20
96. Triangles.	60

F. A. Rehier & Co., Chicago, Ill., issue a circular showing, in convenient form, their different patterns of Transom Lifters, of the manufacture of which they make a specialty. They call special attention to their new No. 301 Self-Locking Transom

Lifter, the improvement in which consists in the combination of the handle fastened to the operating rod, connected with the flat stationary locking and guiding bar, placed at the lower end, which is referred to as locking the long operating bar securely in any desired position and preventing it from being bent, displaced or broken. A full description of their Lifters is also given in their catalogue. Their discounts applying to their list January 1, 1887, are as follows:

Bronzed Iron Rods..... 50, 10&2%
Brass or Real Bronze..... 30%

The manufacturers of Tackle Blocks, who have for some time been considering the feasibility of a more satisfactory understanding in regard to production and prices, have consummated an arrangement which is expected to give this line a greater regularity than has recently characterized it.

G. & M. Nolin, Skowhegan, Maine, manufacturers of Scythes, Grass Hooks and Sheep Shears, quote their Grass Hooks and Hay Knives to the retail trade at the following prices:

Grass Hooks, per doz.	82.25
Hay Knives, per doz.	10.00

Items.

The Terry Mfg. Company, Horseheads, N. Y., have issued a new catalogue, in which they describe their Hardware specialties and call attention to their foundry and machine shop. Descriptions are given of their Standard Bracket, Double-Braced and Thimble Bracket Rack, the Terry, Ideal, Leader and Favorite Hangers, Stay Rolls, Door Pulls, Wire Cutters, Harness Hooks, Chest Handles, &c.

Westcott Chuck Company, Oneida, N. Y., in their illustrated catalogue of Westcott's Patent Chucks, describe two styles of Drill Chucks, the Little Giant Improved and the Oneida, and five styles of Lathe Chucks, Scroll Combination, Geared, Plain, Universal, Independent and Cut-Off. The special features of these Chucks are explained, with illustrations showing clearly their construction.

The Toledo Block Works, Toledo, Ohio, issue a neat and convenient catalogue representing their Wood and Wrought-Iron Tackle Blocks, Lignum-Vite and Iron Sheaves, &c., and alluding also to their Sidewalk Lights, Gratings, Iron Fencing, Stairs, &c.

Bonney Rapid Vise Company, Clinton, Iowa, issue a four-page price list, describing, their Rapid Transit, New Giant, Patent Never Slip Pipe and Bench, and other new patent Rapid Vises. They expect before long to issue a 20-page catalogue of these Vises with some recent improvements.

D. C. & H. C. Reed & Co., Kalamazoo, Mich., issue a catalogue in which they describe a line of Floating Spring Tooth Harrows, One and Two Horse Spring Tooth Corn Cultivators and Broadcast Seeders. It describes a variety of implements and machines, in which some improvements have been made within the past year.

Sargent & Greenleaf, Rochester, N. Y., for whom Sargent, Greenleaf & Brooks are agents, 43 Franklin street, Chicago, Ill., issue a very elegantly printed revised price list of their Key Locks, Bolts, &c., in which they represent their line of Mortise Locks, Night Latches, Cabinet, Trunk and Chest Locks, Tin Box Locks, Padlocks, Sub-Treasury, Safe Door Safety Deposit Locks and other fine goods. Their Combined Lock and Latch for outside doors of dwellings is prominently illustrated, and the excellence of its construction and its security emphasized. It is evident that the company have added many new Locks to their line, while at the same time older styles have been improved. Sargent,

Greenleaf & Brooks, 43 Franklin street, Chicago, have also issued a new price list of this line, without illustrations. They are offered as especially adapted to the wants of the best Western Hardware trade. Attention is particularly called to their Adjustable Spindle for Knobs.

E. T. Barnum, Detroit, Mich., has issued his spring supplement which relates to Roof Crestings, Counter Railing, Iron and Wire Settees, Chairs, &c. Wire and Iron Window Guards, Stable Fixtures, Fire Escapes, and an extensive variety of Builders' Wire and Ironwork.

A gentleman connected with the trade in Agricultural Implements who has recently returned from a trip to China refers as follows to the tools used in that country and the lack of enterprise manifest in their antiquated forms:

The one thing that struck me most forcibly of all the queer things to be seen there was the wretched Agricultural Implements the people use. I am in that line of business myself, you know, and that is the reason, I suppose, why the want of good tools impressed me so much. If the Chinese are as shrewd and inventive as they claim to be, why have they used for thousands of years a plow that is simply a broad blade fastened to one rough handle and never cuts the ground deeper than 6 inches, generally 2 or 3? They thresh yet with a stone roller and winnow by tossing the grain into the air. For a harrow they use the hoe, and everything else about the farm is on a similar scale. The nation is largely composed of farmers and there ought to be a splendid market there for American Implements. One great obstacle in the way, of course, is the conservative spirit of the people, and another their extreme poverty; but if they could once be waked up to the possibilities that lie in the use of decent farming tools, the magnitude of the demand that would ensue would well repay the pioneer manufacturer who risked some money in the endeavor.

Thomas H. Chubb, Post Mills, Vt., has issued a handsome and comprehensive retail catalogue for the present year, showing a large line of Fishing Rods and Anglers' Supplies, most of which are referred to as of his own manufacture, the others being made to order and carefully selected, so that anglers can depend upon the goods as being as represented. The catalogue opens with a description of Chubb's Hexagonal or Six Strip Bamboo Rods, the different patterns of which are illustrated. Illustrations are also given showing some of the different departments of his factory. Reels in large variety, Flies, Hooks, Spoons, Fly Books and miscellaneous Anglers' Supplies are also prominently represented.

F. Rolson, Baltimore, Md., issues his catalogue with appendix, in which new patterns of Refrigerators and Buffets are illustrated and described.

A. J. Jordan, 612 Washington avenue, St. Louis, Mo., issues a circular calling attention to his line of AAA1 Cutlery, in which he alludes to his extensive establishment running through from Washington avenue to St. Charles street, and his factory in Sheffield, England. The extent and excellence of his assortment are alluded to, and a number of illustrations given representing some specialties and leading goods in his line.

Bullard & Gormley, dealers in Builders' Hardware, Cutlery, Tools, &c., 106 Lake street, Chicago, have secured the adjoining store, No. 108, and intend to fit it up as an exhibit and salesroom of Builders' Hardware Specialties. They intend to exhibit full-size working models of such articles as they shall select, and will have experienced retail Hardware salesmen to explain them and set forth their merits. They will also canvass architects, owners

and builders in the interests of the same. They will make no charge for standard goods, the profit on the sales being expected to pay for the trouble taken and expense incurred. Special arrangements will be made with manufacturers of new articles which are to be introduced. They solicit correspondence with manufacturers on this subject.

The *West Coast Trade*, alluding to the leading business houses of Tacoma, Wash., refers at some length to the Tacoma Hardware Company, John Macready & Co. and Hunt & Mottet. The Tacoma Hardware Company were organized two years ago and are referred to as having met with excellent success and carrying one of the largest and most complete stocks of Hardware on the coast. John Macready & Co. are said to be the oldest Hardware establishment in the city, having been founded by John Macready, of Sioux City, Iowa, who entered the firm in 1883 and has given special attention to the building up of the business since that time. Hunt & Mottet claim the honor of being the pioneer jobbers of Hardware, having embarked in the business in 1884. They have recently increased their capacity for handling goods by the addition of a 35 x 120 feet basement in the Coggswell Building.

Announcement is made by the Wire Goods Company, Worcester, Mass., that they have purchased the entire stock and plant of F. O. North & Co., Boston, Mass., and will add their line of Automatic Blind Fixtures to their regular list of manufacturers. They send out a circular relating to these goods and illustrating their construction and use. They also issue a new page for their catalogue, in which they give revised list prices on their Universal Double-Joint Chain and illustrate its use as a sash chain. A page also refers to Chain Links.

Rector & Wilhelm Company, Omaha, Neb., issue an attractive 52-page price current, relating principally to seasonable goods. It contains quotations, which are given in cipher, the key being prefixed. It is prefaced by the following circular to the trade:

We trust you will preserve this circular, because you will find in it many goods that your customers will call for from time to time, and you can make sales by it and make money on the sales. Because it will serve to remind you that we want your business, and that you can save time and money by placing it with us, because we make prompt shipments, low prices, and don't substitute; give special attention to mail orders and guarantee careful selection of goods and bottom prices, and because you can order goods from us, get them in and sold, the money in your pocket and more goods on the way before your goods are in from the East. "A nimble nickel makes a fat dollar." Your inquiries and orders solicited. Prices always right. We invite attention to the fact that we are direct importers of Tin Plate, receiving same direct from the makers in Wales through the Omaha Custom House. This assures our trade a first-class grade of Plate in perfect condition and free from the manipulations of tricky importers and brokers. Our Tinto Terne is the finest in finish and working qualities ever sold for the money, and the genuine Calland Brand has no superior. Write us for special prices on large lots.

William H. H. Bixler & Co., Baltimore, Md., have improved their Patent Oyster Winder during the past season, giving it a much wider spool. This permits the use of a larger rope and adapts the Winder more particularly to oyster beds in deep water. This Winder is referred to as popular and in general use on the oyster grounds of Maryland and Virginia, and as having been used to a limited extent on Long Island Sound and neighboring oyster grounds. They have lately been ap-

pointed Southern agents for Richardson's Steerers and the Eureka Ice Crusher, and are also agents for the Somerset, which is referred to as something new in steering machinery.

St. Joseph Pump Company, St. Joseph, Mo., issue a new edition of their circular relating to the Perfection Water Elevator and Purifying Pump. They illustrate the construction of the cup or bucket and its use in the pump, pointing out the advantages possessed by it. They also give price list.

It will be seen by the advertisement on page 47 that the long-established business of the late George S. Arnold is offered for sale. For those desiring to engage in this line of trade—plumbing, gas-fitting, stoves, mantels, &c.—the opportunity is deserving of their attention. Full particulars may be obtained from the administratrix, Eva G. Arnold, corner State and Crown streets, New Haven, Conn.

The Northwestern Rubber Company have succeeded to the business of both the Hamilton Rubber Company and R. T. Whelpley, of Chicago. They will maintain at 141 Lake street, Chicago, the sole Western agencies of the factories of the Hamilton Rubber Company, the Star Rubber Company and the New York Woven Hose Company. The new company is a corporation with a paid-up capital of \$100,000. R. T. Whelpley is treasurer and Edgar Whitehead secretary. They desire to impress upon the trade that they are not jobbers in the sense of middlemen, but are the direct agents and distributors of the product of the companies above named and carry in stock a full line of their goods, to be furnished at manufacturers' prices. They notify the customers of the Star Rubber Company that on the 18th of February the injunction issued against them by the Boston Woven Hose Company was dissolved in the United States Circuit Court at Trenton, N. J.

Hartley & Graham, 17 and 19 Maiden lane, New York, have issued a price list, March, 1889, of Guns, Revolvers, Ammunition and Sporting Goods. Besides illustrating, with list prices, the leading goods in these lines, it calls attention to the fact that they are agents for the Union Metallic Cartridge Company, Bridgeport Gun Implement Company, Remington Arms Company and other manufacturers.

Cleveland Spring Company, Cleveland, Ohio, issue a small price list of their Carriage, Wagon and Seat Springs, of which the different patterns are illustrated. They emphasize the claim that they make Springs with solid steel heads without seam or weld. They also issue circulars relating to their new Triple Duplex Carriage Gear, and the American Chief and Lone Star Duplex gears.

Jones Hollow-ware Company, Baltimore, Md., manufacturers of Enamelled, Turned, Round and Plain Hollow-ware, have appointed King, O'Connor & Co., Baltimore, Md., their exclusive selling agents for the South. They will carry a stock of the goods at their warehouse, 11 West German street, and will be in a position to guarantee prompt shipments at lowest market rates. A similar announcement is made by the Mount Carmel Bolt Company, manufacturers of Wood Screws, Tire and Stove Bolts, Rivets and Washers, Mount Carmel, Conn., who have also appointed King, O'Connor & Co., their exclusive selling agents for the South.

The new catalogue of the Cleveland Twist Drill Company, Cleveland, Ohio, represents very satisfactorily their line of Increase Twist Drills, Self-feeding Reamers, Taps, Cutters, &c., of which a large assortment is thus offered to the trade.

They have very much improved and enlarged some of the lists, among which may be mentioned Nos. 111, 116, 118 and 120, and they have added No. 113 Dowel Point Drills and No. 115 Bit Stock Countersinks. They refer to the fact that their Drill has a flute of equal area from the point to the shank, and that each Drill is carefully inspected after every operation. They refer also to the fact that they are the sole manufacturers of Miller's Patent Self-feeding Reamers. Micrometer calipers are used throughout their entire factory, and parties ordering special tools are requested to give sizes wanted in thousandths of an inch. The catalogue also represents the Drill Cases made by the company, of which three sizes are offered to the trade. Since moving into their new factory they advise us that they have had all the business they could handle, and the prospects for the year are regarded as exceptionally good.

That Boy and His Future.

BY KNARF.

There is so much and so many things that go to make up a man's character, so many causes for defeat or success in life, so much in the make-up of the man, as a whole, that to analyze these perfections and defects is a Herculean task. The inherited dispositions and pre-dispositions are the easiest to cultivate or the hardest to overcome. Things bred in the bone crop out through life, however much external enamel has been put on by society, education or cultivation. No character is perfect at the first, and it is a part of the necessary work of life, a labor at which we must continue, to change these defects to the standard of our perfections to insure a perfectly rounded life. This is a work to be begun early in life—so early, in fact, that few boys or young men are capable of going it alone, but need sage advice and persistent looking after at the start, and a start in the right direction is almost always indicative of the ending. The natural trend of a boy's mind, if not wrong, should be encouraged, and all the natural aptitudes taken advantage of, in selecting what will be for him his perspective life-work. The writer's opinion, strengthened by years of experience, and an assurance that he was started wrong in his life-work, is this: That every boy should have a trade or profession. Almost every boy shows a predisposition for books or tinkering. Of course there is a certain percentage of men that never amount to anything, others who do not appreciate advantages given them, but this does not lessen the responsibility of the natural guardian of the boy to try and start him right. A father said to me: "My son of 14 has no idea or desire to accumulate money, and no appreciation of money value; he wants to read all the time. I wanted to make a business man out of him, but there is no business in him." Upon inquiry, I found travels and history were the boy's delights, and my advice was to put the best of such books in his way, and if his likings did not change to give him a college education and let him choose a profession. He is not a delicate boy, but large for his age, robust, and enjoys exercise, and has a constitution that, with care, will permit of a large amount of hard work. Another father, a mechanic, of German extraction, in conversation said: "It is hard for me to get along, particularly now. I have two boys and a girl to whom I am giving a good public school education, also music, and when the boys are old enough they shall learn a trade; and if they can't get along then, they couldn't if they were millionaires. The music will give them a cordial reception in the best society wherever they go." To me this was the most sensible plan of education I had ever heard.

We take it for granted that the moral

and religious training is an accepted necessity, so I will not enlarge upon that at this time. It is a deplorable fact that our most skilled workmen in mechanical departments are foreigners, and they are skilled because they thoroughly understand their trade. While the range and extent of a mechanic's trade has been curtailed by developments in machinery, yet, what he has to know should be as thoroughly known as when the carpenter went to the woods to cut the timber for the house. A great mistake is made in not lending the apprentice your experience, and encouraging him with the thought that dirt and drudgery will not be his life always, but that the highest degree of perfection leads to higher planes. After a start has been made and the young man finds he is not suited to the business he has chosen, it is no always a sign of a fickle nature to want to make a change. The sooner a person gives up a line he doesn't like the better for him. No man can make a success of anything that he can't enter into heart and soul. A lawyer of note was sitting cross-legged on a tailor's bench at 22: a doctor had medical books stuck under the counter in the country store at 18, and so we might name many more instances of the same kind. As a tailor or clerk these men would never have been a success. Circumstances are often such that a man can't make a choice, but is pushed on by the inevitable to work at something uncongenial, and something he is unfitted for by education, disposition and temperament. To that person I would say, change as soon as you can. Life is too short to waste time and energy on something out of which you cannot get satisfactory results. If you can make a living out of what you are not fitted for, you can make a big success of what you like. It often takes moral courage and grit to make such a change, but when your mind is once made up, and the opportunity offers, don't hesitate.

There are fewer failures in trades than in mercantile life. In the latter only one-tenth that start succeed. The weekly reports of failures throughout the United States show that 200 or 300, for one reason or another, have failed to connect and have shut their doors. On the other hand, I have never known a good mechanic to be long without a place to work, however many poor workmen may be unemployed. Those who strike are not included in the above statement. The history of the results of strikes has been that the striking workingman has failed to secure any higher rate of wages than the man who has independently and unaided by societies put his labor and skill into the market for what it would bring.

Young men are anxious to go into business for themselves, to be their own boss. This is very enticing, but, as a rule, they have little or no idea of the expenses, responsibilities and small results that are contingent upon such a move. Passing along the business portion of the town they see stores with attractive stocks of goods, warm and comfortable inside, and it seems so easy to run a store. But they little know the worry and trouble piled up behind the smiling face of the proprietor, of the bills payable and unpaid accounts receivable, of the loss in the last year's business as shown on the inventory just taken and of the unexpressed yearnings to be as free from care as the envious young man on the outside.

The buyer and head of a wholesale house said in my presence that he would gladly exchange his work with any porter in the house and pull up goods all day on a hand elevator. The methods of doing business are changing so rapidly, the competition is so strong, the mass of people are becoming each year more conversant with the value of goods by reading circulars and price lists sent broadcast over the land, that the business man must

continually hustle to even make a living. Losses on book accounts, losses on old and depreciated stock, rapid change of styles—all these and many other things cut a deep notch in the merchant's profits. The time is passed when the merchant can say to a customer: "If my price don't suit you leave the goods." The veracity of the average customer may well be questioned, as there is no hesitancy on their part to mention a price at which your competitor offered them the same article. Rather than acknowledge that they are wrong they will pay your asking price somewhere else.

Real estate investment will pay better than a business enterprise, as a rule. It is safe to say that any piece of property has doubled in value in the past 25 years. It is also safe to say that very few business houses in the country 25 years ago are in existence to-day. If the young man has a few hundred dollars, instead of going in business, and consequently giving up his situation, let him buy a lot. Buy it in the part of the town or city that is growing most—the direction in which the town is moving. Buy the best lot you can, even if you have to borrow some money to pay for it. By saving you can soon wipe out the debt, and it will be an incentive for you to save. Usually it is not a good idea to have interest to pay, unless you have interest coming in to offset it, but you will be excused in this case, as the advance in your property will more than off-set the interest. As soon as your lot is paid for you will have no trouble in borrowing money enough to build a house and rent it. Then your rent will pay your interest and some be left to apply on your principle. By this time people will begin to notice you and say, "He is a saving boy," "a thrifty fellow." You will think more of yourself and others will think more of you. Very soon people in tight places will offer you bargains in property and before you are ten years older you will be on the way to wealth.

The advice to the young man is equally good for the parent or guardian. Start the boy by helping to pay for a piece of property; it will encourage him and also teach him the value of money in the paying of his part of it. The habit of economy and saving will be of incalculable value to him in the future. It will give him standing and prestige. There is hardly a town you can go into that you will not have pointed out to you lots or pieces of land which your informant will tell you could have been bought for so-and-so five or ten years ago, and that he had the money to buy with and now sees how foolish he was not to buy. You say to him: "Why not buy some lots now?" "Oh no; they ask too much money for them." And that was the reason he did not buy five or ten years ago—they were too high then, and in ten years more he will see the mistake he is now making. Of course, in some of the older Eastern villages property is decreasing in value; in the same localities merchants' sales are growing less each year; people, especially the young men, are seeking homes where there is more life—these are the places to invest.

We do not suppose that all readers of *The Iron Age* will invest in real estate after reading this article, and for this reason the chances for young men who have a little money—or should have—and want to invest are all the better. Ask any business man of experience if in the past 10 or 20 years he would not have made more money by investing in real estate and working on a salary than he has made in his business and then abide by his decision.

Witherbees, Sherman & Co., of Port Henry, are about to make exhaustive experiments on magnetic separation. At an

early day the Ball-Norton machine is to be tried, followed by the Wenstrom, Edison and others.

The Coke Trade.

Advices from the Connellsburg region are to the effect that a slight improvement in the demand for coke has taken place, and production and shipments have increased to some extent. There has also been a stiffening in prices and there is not so much cutting being done in order to effect sales. While the price of coke has been published for some weeks as \$1.25 per ton, it is known that there has been a large amount sold under this figure. It is believed that if the demand continues to improve, the published price will be more easily obtained than is the case at present. For the week ending on March 2 there were 12,151 ovens in blast, 1110 idle and 720 in process of construction. During the two previous weeks there were 12,383 ovens in blast and 878 idle. The shipments for the week ending on March 2 were as follows: To Pittsburgh and river points, 1200 cars; to points west of Pittsburgh, 3520 cars; to points east of Connellsburg, 1160; total, 5880 cars. The figures for the previous week were as follows: Pittsburgh, 1200 cars; West, 2820; East, 1100; total, 5120. The increased shipments west of Pittsburgh are due to the fact that a number of large furnaces which have been overstocked with coke have commenced to receive shipments again. Prices may be quoted nominally as follows: Furnace coke, \$1.25; to dealers, \$1.35; foundry coke, \$1.50; crushed coke, \$2.20; all on board cars at ovens, per ton of 2000 pounds. Freight rates from ovens to Pittsburgh, 70 cents per ton; to Shenango Valley, \$1.35; Cleveland, \$2.80; Chicago, \$2.75; East St. Louis, \$3.20. Foundry prices at Western points are quoted as follows: Chicago, \$4.25; St. Louis, \$4.70; Louisville, \$4.70; Kansas City, \$6.75; Toledo, \$4.00; Buffalo, \$4.00. In the latter place, Reynoldsville coke is quoted at \$3.25 and at Chicago at \$4.25. New River coke brings \$4.25 at Chicago and \$4.75 at Louisville.

A company composed of Maine and Illinois capitalists has purchased over 2100 acres of iron-ore land in the vicinity of Bluffton, Ala., and have so far advanced that they are now asking bids on a coke furnace having a capacity of 100 tons per day. The concern alluded to is called the Bluffton Land, Ore and Furnace Company, which is now shipping 200 tons of brown ore daily to Tennessee furnaces, preparations being under way to increase the output to about 500 tons per day. Bluffton is on the Selma Division of the East Tennessee Valley and Georgia Railway, and two miles from the East and West Railway of Alabama. S. H. Keller, of Williamsport, Pa., is building for the Bluffton Company a large hotel.

Steel pipe has been adopted by the city gas companies of Chicago in preference to wrought-iron pipe for making connections between the mains and houses. The two kinds of pipe had been previously subjected to very thorough comparative tests, which the steel pipe is reported to have endured the most satisfactorily. The quantity which will be used this year will be about 1,000,000 feet. The manufacturers of steel pipe regard their victory in this contest as of much importance.

When Secretary Whitney relinquished his office he left as a legacy to his successor the responsibility for building eight new vessels, authority for whose construction was given by the Fiftieth Congress during its session. The list includes three

2000-ton cruisers or gunboats, vessels somewhat larger than the *Yorktown*, just finished, and similar to that vessel in many respects, although embodying many new features. There will be two 3000-ton cruisers. These vessels will be smaller by 1000 tons than the new cruiser *Newark*, but by law they are required to attain the extraordinary speed of 20 knots an hour. A great ironclad of 7500 tons, a protected cruiser of 5300 tons and a small gunboat of 800 tons burden complete the list. Designs for these vessels have already been prepared by a naval board and await approval by the Secretary. Meanwhile, in anticipation of that approval, Commodore Wilson, of the Construction Bureau, has added to the force of draftsmen employed in preparing the details of the designs, and it is believed that advertisements for proposals for building some of the vessels could be issued within two months.

It is stated that Perry & Co., stove manufacturers, of Albany, N. Y., and at 86 Beekman street, this city, have obtained an extension from their creditors of 6, 12, 18, 24 and 30 months, on liabilities of about \$330,000, a large part of which was for borrowed money. The committee of creditors appointed to take charge of the matter consists of Robert C. Pruyn and Edgar Cottrell, of Albany, and a member of the firm of Nash, Spaulding & Co., of Boston. It is understood the firm's indebtedness is to be liquidated by the collection of the bills and accounts receivable due the firm, which will require considerable time. It is said that John S. Perry has also transferred all his individual property, estimated at \$80,000, to the committee of creditors as security for the payment of the firm's debts. The Perry Stove Company who have succeeded to the business of the firm, were incorporated January 1, 1889, with an authorized capital stock of \$500,000, and take the plant and foundry of the old firm, valued at \$345,000. Arthur A. Thompson, the manager, at 86 Beekman street, said that Perry & Co. had just obtained the extension of 6, 12, 18, 24 and 30 months, which would be paid out of the bills and accounts receivable as collected, and that the liabilities were about \$330,000. He wished it to be distinctly understood that the extension was solely of the debts of the firm of Perry & Co., and had nothing whatever to do with the Perry Stove Company. The latter took the plant and foundry as the contribution of the Messrs. Perry to the capital stock of the company, and the company have a cash capital of \$200,000.

The freight rates on pig iron from the Shenango Valley, Pa., and the Mahoning Valley, Ohio, have been advanced to \$3.30 per ton to New York and \$4.30 to Boston. The new rates will go into effect on Monday, the 18th inst.

The Navy Department has postponed from March 15 to April 3 the time for receiving proposals for the construction of an armored coast-defense vessel. This order of postponement was Secretary Tracy's first official act.

Some of the Board of Directors of the Panama Canal Company propose that the Tehuantepec Ship Railway Company shall substitute their system for the proposed canal on the unfinished part of the work, about 42 miles. The estimated cost for building the canal for this distance is \$160,000,000. The ship railway would cost \$40,000,000.

The Emigration Commissioners at this port in their report to Washington ask that the power transferred from them to the Treasury Department not long ago may be restored.

New Anthony Wayne Washers.

The Anthony Wayne Mfg. Company, of Fort Wayne, Ind., have just completed what will be designated to the trade as

rectangular, as is done in other machines of this kind. This obviates the catching of clothes on the corners, which would occur in the use of a square shaft, causing a dragging motion in addition to making



Fig. 1.—The Improved Anthony Wayne Washer.

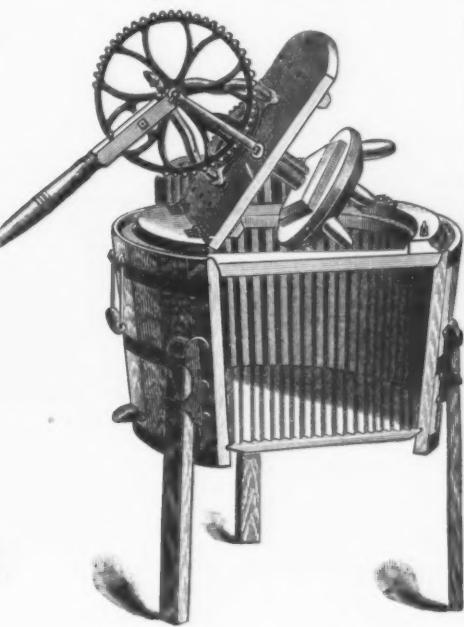


Fig. 3.—Interior View of Nos. 2 and 3.

their New Nos. 2 and 3 Washing Machines. The accompanying description and illustrations have more especial reference to the No. 2 machine, the No. 3

the machine run hard or heavy. The upper portion of this shaft and the small bevel gear-wheel (14), Fig. 2, are cast in one piece, thereby avoiding all possibility of

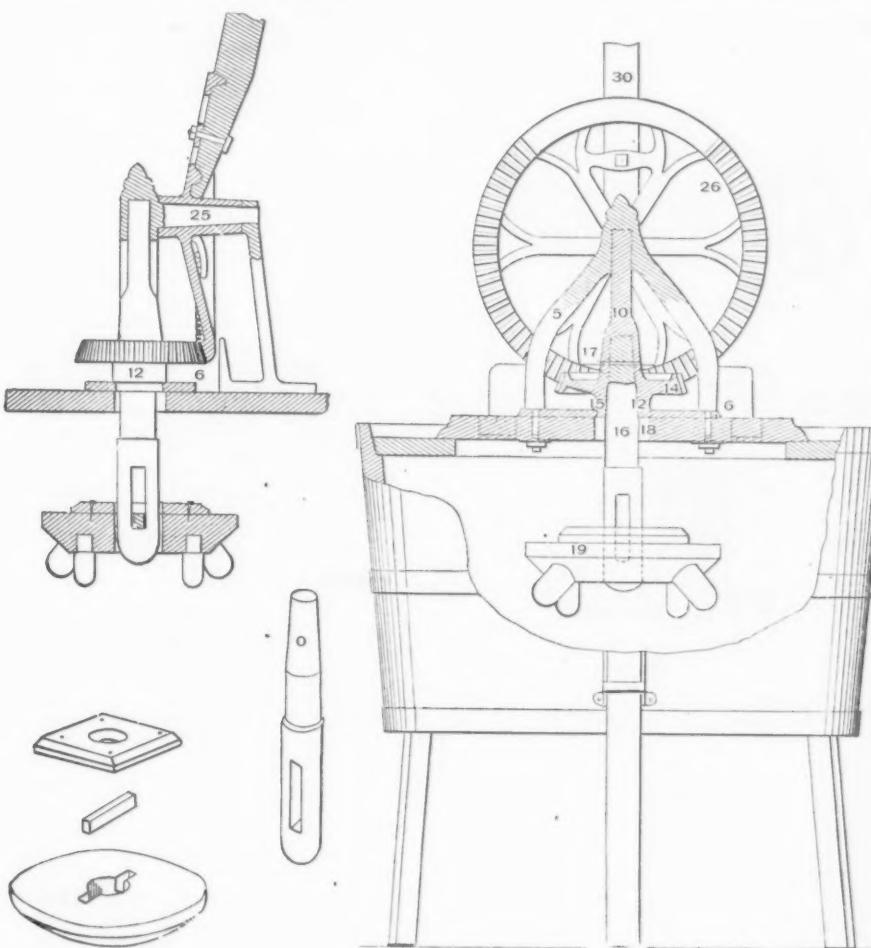


Fig. 2.—Construction of Anthony Wayne Washer.

being but a modification in a few minor details of the No. 2. In reference to the

the latter becoming loose and rocking on the wooden shaft heretofore used. The wooden post or shaft has a good bearing for its shaft as being made round instead of

(12), Fig. 2, is held in its place by the arch, into the feet of which it is recessed, so that the whole gearing is made as one piece and cannot get out of order. The wooden post in the new machine is entirely below the lid, and is fastened to the iron by being driven into a socket and held in its place by an iron pin through the post. Journaled in a bearing in the central and highest portion of the arch (5) is a vertical metal shaft (10), having a socket (12) at its lower end, which rests upon the plate (6) and is provided with a deepening collar (13), which lies in an opening in said plate, the whole forming an immovable bearing or journal for the shaft (10). Cast upon the lower end of the socket piece and forming one piece with the vertical shaft (10) is a miter gear (14), having a horizontal shoulder (15) resting upon a plate (6); inserted in the socket of the metal shaft is a cylindrical shaft (16) of wood attached to the metal socket shaft by means of a transverse pin (17); this wooden shaft passes down through an opening (18) in the lid, which is closed by the collar (13) of the metal shaft. Upon the lower end of the wooden shaft is mounted a dasher or agitator (19). Through the center of the disk of agitator is an opening large enough to admit of a free motion of the lower section of the wooden shaft. Upon the upper and central portion of the arch (5) is the journal (25), upon which the miter gear (26) meshing with miter gear (14) revolves. This miter-wheel has a hub 3 inches long, providing a steady motion, and cannot be thrown out of gear with miter gear (14) when in motion. This miter-wheel (26) is cast with four nipples, two near the center (27) and two near its periphery (28), between which the actuating lever (30) is forced, the same being bolted to a brace connecting the spokes of the wheel. This gives an exceedingly firm and durable connection for the lever, which may be quickly attached or detached. Another improvement in this machine is the corrugated stave and bottom, which form a regular washboard all around and in the bottom of the machine. It is pointed out that in other machines the ribs that form the washboard are nailed to the sides and bottom, which is avoided in this machine, in which the corrugation is formed on the solid stave and bottom, giving the machine a chance to dry, and thus increasing its durability. Fig. 3 gives a view of the interior of the machine, illustrating this feature. Two sizes of these washers with corrugated staves are made, No. 2 being the large family size and No. 3 a smaller size for family use.

Florida orange growers predict that in a few years the States of Florida, Louisiana and California will be able to supply the entire demand for this delicious fruit. The pecuniary motive for engaging in orange culture is sufficiently strong, as appears from the fact that while an acre devoted to the culture of cotton will produce a crop worth \$50, a well-established orange grove will yield \$300 an acre at the low price of \$1 a box. George R. Fairbanks, president of the Florida Fruit Exchange, in an address before the American Pomological Convention, recently held at Ocala, said: "When we realize that more than one-fiftieth of the orange trees in Florida are bearing, we are amazed at the possible and probable future development of this industry." The present total domestic production is about 4,000,000 boxes, of which California and Louisiana furnish about one-quarter, and the imports from abroad amount to about 3,000,000 boxes in addition.

Among the departmental decisions of the Canadian Customs is one making the rate both on round iron galvanized rods and on galvanized bar iron 40 per cent.

Steel Spider.

The accompanying illustration represents an article put on the market by the Bronson Supply Company, corner of Lake and Coe streets, Cleveland, Ohio. It is the first of a line of steel hollow-ware for which they have adopted the trade-mark "Never Break" as applied to hollow-ware. These goods are described as stamped from

*Steel Spider.*

heavy cold-rolled pickled steel and finely finished. Besides the durability of these goods the point is also made that they are superior to the common goods, inasmuch as they are made from a homogeneous steel, which will not absorb the grease, and are therefore more cleanly and more easily cleaned after using. It is claimed that in cooking any article of food with them the absorption of the article cooking is impossible, thereby preventing imparting the taste of one kind of food to another, as is often the case when the vessel used for cooking is made from a material of a porous nature like cast iron. These spiders are made in the following sizes: 7, 8, 9, 10 and 12 inch. The prices at which they are sold are given in the Trade Report.

Bartlett's Bit Box.

The accompanying illustration represents this article, which is put on the market by Geo. H. Bartlett, 79 Chambers street, New York. This box, which is made of wood, has, it will be seen, holes in it to receive bits of the different sizes,

*Bartlett's Bit Box.*

the cut representing one adapted for a full set of 32½ quarters. The hinges are, it will be observed, so constructed as to allow the cover to be raised clear of the shanks of the bits, and then tipped back. When the box is closed the jointed pieces of brass which constitute the hinges are inserted in the apertures made in the box

to receive them, so that the cover rests tightly on the box, where it is fastened by the hook shown. With this construction, if desired, the top of the box with the hinges can be entirely removed from the box, and replaced by simply reinserting brass bars. The points made in regard to this box are: That the bits are thoroughly protected and separated, so that they cannot get loose or come in contact

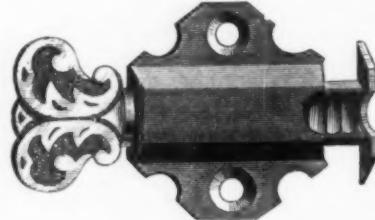
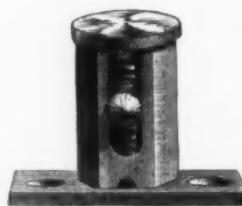
lower sash and will lock the window at any desired point with safety; that by using the lock on top corner of lower sash the upper sash can be dropped and fastened, or the lower sash raised and the upper one dropped, thus giving ventilation to the room and securely locking the window; that this lock can be employed as a ventilator by the use of the adjustable screw, which can spread the sashes apart or draw them together; and that by its use rattling is prevented. The sash lock is made in Tucker and plain bronze, japan and nickel.

New Mail Box.

The Henry C. Hart Mfg. Company, Detroit, Mich., are offering to the trade the article illustrated herewith. By an ingenious arrangement pilfering from the box

*New Mail Box.***Combined Ventilating and Check Rail Window Sash Lock.**

White & McLure, Penn Building, Pittsburgh, Pa., for whom H. C. Mechling, 12 Cliff street, New York, is agent, are putting

*Fig. 1.**Fig. 2.***Holman's Combined Ventilating and Check Rail Window Sash Lock.**

ting on the market the sash lock represented in the accompanying illustrations, Fig. 1 showing the part attached to the top or sides of lower sash and Fig. 2 the part attached to upper sash. The lock, Fig. 1, is operated by a slide and screw, the thumb piece of which is shown in the cut. This slide terminates with a flat butt end in which is a semicircle which engages with the sphere attached to the vertical screw, Fig. 2, the latter being adjustable to any height required. The manufacturers make the following points in regard to this lock: That it has an adjustable screw for any width of sash; that the lock can be used on either side of sash or on top of

is prevented, as the hand cannot be inserted far enough into the slot to reach the mail deposited within. The box is of artistic design, and the point is made by the manufacturers that besides its utility the elegance of finish which is given to it makes it very ornamental. A spring lock with key is employed, and the opening is referred to as adjustable. The goods are made in antique brass and Saxon bronze, and are packed one dozen boxes in a case.

More than 105,000 people were carried to Washington over the Pennsylvania Railroad during the inauguration period and were delivered in Washington before noon of March 4. It took 210 trains of 10 cars each to convey this immense throng, with an average of 50 persons to a car. All trains were run in sections, and in many cases the number of sections to a given train reached ten. This is the largest number of people that the Pennsylvania Railroad have handled at any one time since the Constitutional Centennial in 1887, when it carried 175,000 people inside of a very few days. The revenue to the company from the inauguration travel will amount to \$500,000.

Proposals have been received in Montreal from the Allan steamship proprietors for the establishment of a Government line across the Atlantic, to run in connection with the Canadian Pacific Railway and the proposed fast line of steamers on the Pacific. It is stated by a member of the firm that the question involves an expenditure of \$5,000,000. At present the Allans are under a temporary agreement with the Government as to carrying mails.

The Electric Dust and Crumb Pan.

In the illustrations presented herewith we show two views of a combined dust and crumb-pan which is being offered the



Electric Dust and Crumb Pan.—Fig. 1.—Perspective View.

trade by Reardon & Ennis, of No. 311 River street, Troy, N. Y. Fig. 1 shows a perspective view of the device, while Fig. 2 presents the plan or top view. The shape of the article, as may be inferred from an inspection of the illustrations, is round, although the makers state that they are not confined to this particular form. It is provided with sloping sides, the angle being such as to allow the dust to be easily swept into the hollow receptacle at the center of the pan. The base is broad, rendering upsetting difficult, while the edges are so made as to prevent warping

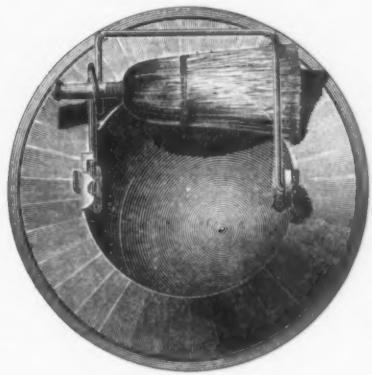


Fig. 2.—Plan or Top View.

or twisting out of shape. In use it may be pushed from place to place with the foot and held firmly when desired. By reference to the engraving, it will be seen

tent of the manufacturers is to place these goods upon the market in a neat and attractive form and at prices which cannot fail to command attention. Patents covering the main features of construction are already pending.

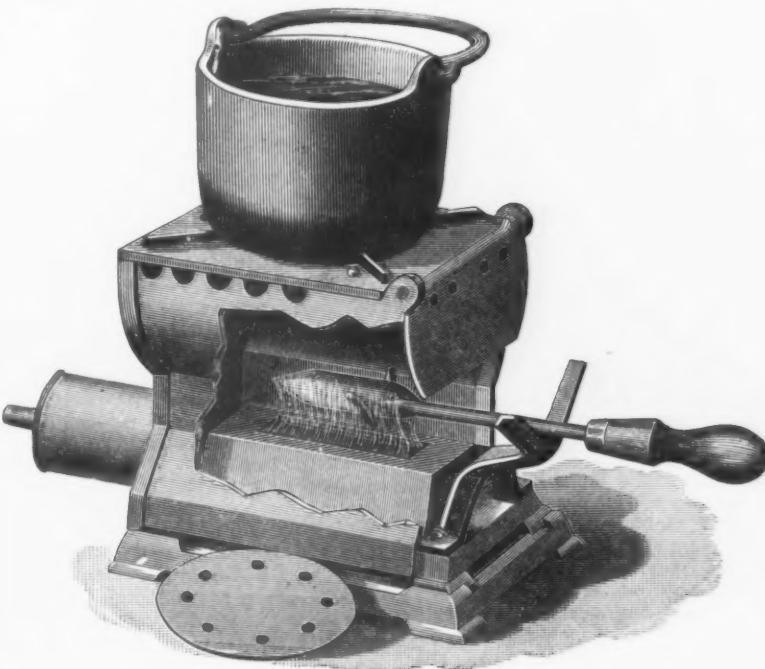
The Flexible Back Curry Comb.

The accompanying illustration represents a new curry comb which has been brought out by the Freeport Hardware

comb." The retail dealer is thus provided with the means of calling attention to this new addition to his stock.

Aeme Gas Furnace.

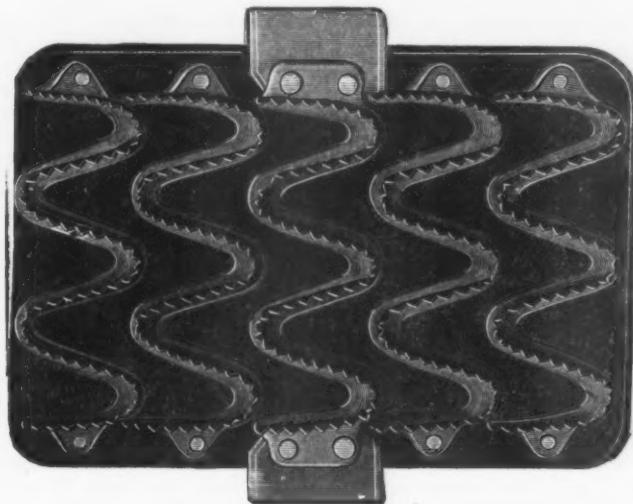
The Buffalo Dental Mfg. Company, of Buffalo, N. Y., are offering for tinnery use an improved form of furnace for heating solder coppers, a general view of which is shown in the accompanying engraving. A portion of the side of the furnace is



Acme Gas Furnace.

Company, of Freeport, Ill., and is sold to the retail trade by Hibbard, Spencer, Bartlett & Co., of Chicago. It is made with a leather back, to which rows of iron teeth are riveted, as shown in the cut. This form of construction insures perfect flexibility, so that the comb can be used to advantage around the joints of animals, over their legs and in depressions in their bod-

broken away, clearly indicating the position of the coppers when being heated. In the construction of the furnace the arrangement of parts is such that two flames issue horizontally from narrow slits, and, meeting under the soldering iron, envelop it as they rise. It will be noticed from an inspection of the cut that there is a clear space just below the iron, so that any solder dropping from the iron falls through the burner and is caught upon a tray placed below. By this means clogging of the burner is impossible. The furnace is almost wholly of cast iron, the top of the hood being flat and provided with a griddle-hole for use in melting solder or heating articles to be soldered. The manufacturers state that either one or two irons may be heated at a time, as may be desired. The openings for the admission of air have been so arranged that the flame is protected from drafts, and the furnace may be used before an open window without the least trouble. The mixing tube is covered with a jacket, perforated below and opening into the interior of the hood. There is a slide on the mixing tube for the purpose of closing the air inlet when desired, and thus control the quality of the flame. The hood and jacket are locked on to the body of the burner, and secured by the nipple on which the rubber hose is slipped. The principal features of construction form the basis of a patent now pending.



The Flexible Back Curry Comb.

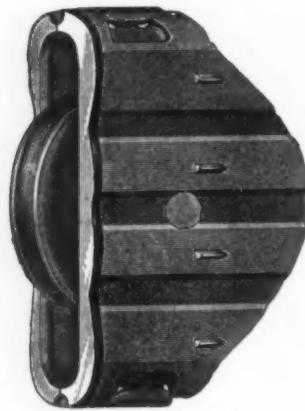
that two styles of handles are employed, one made of wire, with a loop to hold a whisk-broom, and the other constructed of malleable iron and riveted to the side of the pan. The former style of handle is so made that it is capable of being locked into ears, holding in a vertical or horizontal position. In this form it is designed for use as a crumb-pan. The in-

ies, its action being particularly pleasant for nervous creatures. In connection with this article Hibbard, Spencer, Bartlett & Co. have introduced an attractive feature which is quite a novelty. In each box of half a dozen combs they place a rubber stamp and a stereotype for newspaper advertising, both reading as follows: "Examine our 25-cent flexible back curry

An oil refining and shipping depot in connection with a new steamship line to Antwerp is being prepared in Philadelphia in anticipation of an extensive foreign trade. Wm. L. Elkins, of that city, is president, backed by capitalists in Pittsburgh who have at command \$1,000,000 for immediate use. There will be four piers 630 feet long and a double decked shed of almost equal length.

Ideal Sash Pulley No. 2.

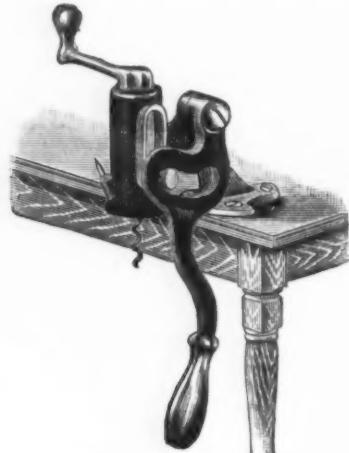
This sash pulley, shown in the illustration herewith given, is made by the Stover Mfg. Company, Freeport, Ill. The points made in regard to it are: That it has a cone bearing axle pulley, noiseless and free in operation, easily and quickly applied, requiring no screws or brads to hold it in place, and when in the frame making a perfect fit. It will be seen that there are lugs or projections on either side of the

*Ideal Sash Pulley No. 2.*

case for spacing the auger holes, and these lugs are also referred to as holding the pulley in the frame after it is applied, thus serving a double purpose. In applying the pulley four holes are bored with a $\frac{1}{8}$ bit on a straight line parallel with the parting groove, using the markers on the pulley case for locating the center of the holes. The pulleys are furnished either ground or unground wheels, and are packed in kegs of about 25 dozen and barrels of 125 dozen.

Enterprise Cork Puller.

The accompanying illustration represents this article, which is made by the Enterprise Mfg. Company, Philadelphia, Pa., for whom J. C. McCarty & Co., 97 Chambers street, New York, are agents, and shows the style in which it is made for attachment by screws to table, counter

*Enterprise Cork Puller.*

or other fixture. It is also made with a clamp, so as to be conveniently attached or detached as desired. The sliding barrel and both handles are described as nickel-plated. It is referred to as exerting great pulling power where the strain is greatest and as being simple and effective.

E. N. Robinson, general superintendent of the San Jacinto Tin Company, reports that an English Company has purchased the property and reorganized in London.

England, under the name of San Jacinto Syndicate, Limited. The capital stock is \$1,500,000. The syndicate bought all the property known as Rancho Sobriente de San Jacinto, near Riverside, in San Bernardino County, Cal. Under the management of the new company the tin mines on the ranch will be thoroughly developed.

An Electric Coal Cutter.

One of the newest and latest applications of electric power to mining work can be seen daily in operation at Mr. T. C. Heimes' Drane Colliery, near Osceola, Clearfield County, Pa. Here a most interesting application of motors for mining work has been devised by F. H. Lechner for operating a coal cutter by electricity. Mr. Lechner is well known as being not only the first inventor of coal-cutting machinery, but also the first to operate compressed air in mines for this purpose. It soon became evident to Mr. Lechner that the best results could only be obtained by operating the motor and cutter apart, as otherwise the size and weight of the cutter with the motor mounted upon it would prevent its easy transportation to the mine. In order to do this the following arrangement has been adopted in the mine before mentioned, and has proved very successful:

The motor, which is a 10 horse-power of the Sprague type, is mounted upon a truck, running upon rails, so that it can be easily handled and hauled from one position to another as occasion requires. The entire weight of the motor is less than 1000 pounds. The cutter operated by the motor, which in this case in the New Lechner, is set in position in the room to be cleared, and is connected with the motor by a $\frac{1}{2}$ -inch rope belt, running in V-shaped grooved sheaves, one being on the motor and the other on the cutter. This connection is long enough to allow the motor to be operated 30 feet away from the cutter, and has been set in a position in this mine 1600 feet away from the dynamo. The motor is held in position by guys at the point of use. By means of screw jacks that can be easily adjusted to any height with loose sheaves upon them the cutter can be operated from any angle from the motor, and the connection is made taut by moving the truck upon which the motor rests, and securing it in the right position by guys.

All mining engineers are familiar with the difficulty attending the working of the cutters in the limited space generally allotted them in mines, and how essential it is to have each machine divested of every pound of surplus weight. They also know what care must be exercised in moving it with great iron crowbars, to prevent injury to the more delicate parts of the mines, and however careful, how frequent it is that connecting-rods and other parts are so impaired that the machine has to be sent to the shop. Then how the rugged action of the engines shake everything loose on the machine, however firmly they may appear to be adjusted. All this is removed by the absence of the engines, the machine running as smoothly as a buzz-saw, and as a consequence, cutting with the same facility. By this plan three machines can be operated by one motor, for when one room is out the motor can at once be hauled to another room where a machine is in readiness and position, cut that room and pass to a third while the coal is being removed from the first two, and the cutters being again placed in position.

It was found, upon a preliminary trial of this apparatus at the Osceola mines, that by its use two men are able to excavate 100 tons in 10 hours, and that they can move the cutter as often as desired without any auxiliary aid. It has been

estimated that the cost of equipping a mine for the purposes of operating machinery with electricity is only about one-half the cost of equipping with compressed air, and the price of maintenance shows about the same proportion of saving.

Snow Armor.

In a recent official test at Frederiksholm, Norway, of the virtues of snow for breastworks, one was constructed 20 m. long, 1.4 high, and 3 m. thick at the ground, sloping up to 1.5 or even 2 m. thick at top. It was made by the soldiers rolling large snowballs, putting them in a row, and then filling the interstices with snow packed tight by means of snow shovels, swords, bayonets, &c. Shots were fired from Garman guns at a distance of only 50 m. Seven shots aimed at the upper portion, about 3 dm. below the top, went clean through, the thickness of the breastwork at the points of penetration varying from 1 to 1.58. Three aimed at about 0.6 or 0.7 below the top remained in the snow and were afterward dug out. It appeared that one of them penetrated to a depth of 1.25, another of 1.20, and a third to a depth of 1.23 only. The snow was quite free from fragments of ice; but the projectiles were all found to be flattened and broadened toward the front. At the time of the experiment, the thermometer stood at $+2^{\circ}$ C. Water was poured over the breastwork and next day it was found covered with a coating of ice. Ten shots were fired, but at a distance of 100 m., and with a result contrasting remarkably with the lesson of the day before. The snow wall was penetrable easily, and the shape of the projectiles was not altered. Seven of them went through where the intrenchment was about 1.59 to 1.63 m. thick, and they could not be found afterward. Of the other three projectiles, two were found at a distance of 8 m. behind the breastwork, and one immediately behind it. Evidently the mass became less compact, or more porous after the freezing, and was more easily penetrable. Colonel Hertzberg draws the conclusion, from the experiments, that if the face of the breastwork is not sloping, but the wall is made to have a minimum thickness of 2.50 m., a rampart of snow may defy any kind of projectiles fired from any distance.

Oil as Fuel.—At the convention of the National Electric Light Association, M. J. Francisco took up the subject of the use of oil as a fuel. He stated that during the past few months the following facts have been gleaned from an extensive correspondence on this subject with parties who are using liquid fuel. The Boston and Albany Railroad Company, after a careful test made in their shops by a Lehigh University professor, say that the cost of fuel is about the same. Though they purchase their coal in large quantities at one time and secure low rates, they prefer liquid fuel, because it is clean and requires no firemen, and gives a better supply of steam. Day, Cordage & Co., of Boston, claim that with Cumberland coal at \$4.50 per ton and liquid fuel at \$1.15 per barrel, they save 15 cents per 100 horse-power per hour, and the oil is preferable. The Fairbanks Scale Company, of Vermont, report that they find it a great saving over coal, while the boilers are heated evenly the entire length; also that the insurance companies have not increased their rates. T. P. Brown, manager of the Toledo, Columbus and Southern Railway, reports a saving of 33 per cent. of the price of coal by using liquid fuel; also that 2 barrels of oil equal 1 ton of soft coal, while manufacturers on his road find it only costs one-half as much as coal for their stationary boilers.

CURRENT HARDWARE PRICES.

MARCH 13, 1889.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.—

Caps, Percussion, 1000—	
Hicks & Goldmark's	
F. L. Waterproof, 1-10's, .50¢	
E. B. Trimmed Edge, 1-10's, .65¢	25 @
E. B. Grnd. Edge, Cent. Fire, 1-10's, .70¢	75 @
Double Waterproof, 1-10's, .41¢	
Musket Waterproof, 1-10's, .50¢	
G. D. S. B., .30¢	

Union Metallic Cartridge Co.

F. C. Trimmed, .50¢	
F. L. Ground, .65¢	25 @
Cent. Fire Ground, .70¢	
Dbl. Waterproof, .41¢	75 @
Dbl. Waterproof, in 1-10's, .41¢	

S. B., Genuine Imp. orded, .45¢	
Eley's E. B., .64¢ @ .55¢	
Eley's D Waterproof, Central Fire, .41¢	
Cartridges.	
Rim Fire Cartridges, .50¢ & .52¢	
Rim Fire Military, .50¢ & .52¢	
Cent. Fire, Pistol and Rifle, .25¢ & .52¢	
Cent. Fire, Military and Sporting, .15¢ & .25¢	
Blank Cartridges, except 22 and 32 cal., additional 10% on above discounts	
Blank Cartridges, 22 cal., .71¢	2¢
Blank Cartridges, 32 cal., .35¢	2¢
Primed Shells and Bullets, .15¢ & .52¢	
B. B. Caps, Round Ball, .1¢	2¢
B. B. Caps, Con. Ball, Swgd., .2¢	2¢

Primers—	
Berdan Primers, .1¢	2¢
B. L. Caps (for Sturtevant Shells), .1¢	2¢
All other Primers, .1¢	2¢

Sheets—	
First quality, 4, 8, 10 and 12 gauge, .25¢ & .26¢	
First quality, 14, 16 and 20 gauge, .10¢	
list, .26¢ & .27¢	
Star, Club, Rival and Climax brands, 10 and 12 gauge, .33¢ & .34¢	
Club, Rival and Climax brands, 14, 16 and 20 gauge, .30¢ & .32¢	
Selbold's Comb. Shot Shells, .15¢ & .25¢	
Brass Shot Shells, 1st quality, .60¢ & .25¢	
Brass Shot Shells, Club, Rival, Climax, .65¢ & .25¢	
I. X. L. 10 and 12 gauge, .40¢ & .52¢	
"Special" 16 gauge, .30¢ & .58¢	
"Special" 10 and 12 gauge, .40¢ & .58¢	
Fowler's Pat., .25¢	

Shells Loaded—	
A. M. Co. List No. 10, 1887, .20 & 10%	
Wads—	
U. M. C. & W. R. A. — B. E., 11 up, .2¢	
U. M. C. & W. R. A. — B. E., 9 & 10, .2¢	
U. M. C. & W. R. A. — B. E., 7 & 8, .2¢	
U. M. C. & W. R. A. — P. E., 11 up, .3¢	
U. M. C. & W. R. A. — P. E., 9 & 10, .4¢	
U. M. C. & W. R. A. — P. E., 7 & 8, .4¢	
Eley's E. B., 11 up, .17¢	
Eley's F. E., 11 & 20, .28¢	

Anvils—	
Eagle Anvils, 20 lb 10¢	20 @ 20¢
Peter Wright's, .9¢	
Armitage's Mouse Hole, .8¢	
Armitage's Mouse Hole, Extra, 11 @ 11¢	
Trenton, .9¢ @ 11¢	
Wilkinson's, .9¢ @ 10¢	
J. & Riley Carr, Pat. Solid, .11 @ 11¢	
Moore & Barnes Mfg. Co., .33¢	

Anvils—	
Miller's Falls Co., \$18.00, .20¢	
Cheney Anvil and Vise, .18¢	
Allen Anvil and Vise, \$3.00, dis 10 & 10%	

Apple Parers—	
Advance, \$4.75	
Antrim Combination, \$2.50	
Baldwin, \$2.50	
Champion, \$2.25	
Eureka, 1888, .17¢	
Family Bay State, \$2.00	
Gem, \$2.25	
Gold Medal, \$4.00	
Hudson's New '88, \$2.75	
Ideal, \$4.75	
Improved Bay State, \$2.00	
Little Star, \$5.00	
Monarch, \$13.50	
New Lightning, \$5.50	
Oriole, \$4.00	
Penn, \$4.00	
Perfection, \$4.00	
Pomona, \$4.00	
Rocking Table, \$4.00	
Turntable, \$4.50	
Victor, \$13.50	
Waverly, \$4.50	
White Mountain, \$2.50	
72, \$4.25	
76, \$5.75	
78, \$6.00	

Augers and Bits—	
Douglas Mfg. Co., .70¢	
Wm. A. Ives & Co., .70¢	
Humphreysville Mfg. Co., .70¢	
French, Swift & Co., (F. H. Beecher,) .55¢	
Cook's, Douglas Mfg. Co., .50¢	
Cook's, N. H. Copper Co., .50¢ @ 10¢ & .50¢ & 10¢	
Ives Circular, .60¢	
Parent Solid Head, .30¢	
C. E. Jennings & Co., No. 10, extension, .40¢	
C. E. Jennings & Co., No. 30, .60¢	
C. E. Jennings & Co., Auger Bits, 2¢ set, .32¢	
Levi's Patent Single Twist, .45¢	
Jennings' Augers and Bits, .25¢	
Imitation Jennings' Bits, .60¢ @ 10¢ & .65¢	
Pugh's Black, .20¢	
Car Bits, .50¢ & 10¢ @ 10¢	
L. Hommodieu Car Bits, .15¢ & .20¢	
Forster Pat. Aug. Bits, .10¢	

Hollow Augers—	
Ives', 25¢ & 10¢	
French, Swift & Co., 25¢ & 10¢	
Douglas', 25¢ & 10¢	
Bonney's Adjustable, 2¢ doz, .40¢ & 10¢	
Stearns', 20¢ & 10¢	
Ives' Expansive, each \$4.50, .50¢ & 10¢	
Universal Expansive, each \$4.50, .20¢	
Wood's, 25¢ & 10¢	

Expansive Bits—	
Clarks' small, \$18; large, \$26, .35¢ & .35¢ & 5¢	
Ives' No. 4, 2¢ doz, .40¢	
Swan's, .40¢	
Steers', No. 1, \$26; No. 2, \$22, .30¢	
Stearns' No. 2, \$48, .20¢	

Gimlet Bits—	
Common, 2¢ gross \$2.75 & .85¢	
Diamond, 2¢ doz \$1.10, .25¢ & 10¢	
Bee, .25¢ & 25¢	
Double Cut, Shepardson's, .45¢ & .45¢ & 5¢	
Double Cut, Ct. Valley Mfg. Co., .30¢ & 10¢	
Double Cut, Hartwell's, 2¢ gross, .85¢	
Double Cut, Douglass', .40¢ & 10¢	
Double Cut, Ives', .60¢ & .60¢ & 10¢	

Bit Stock Drills—	
Morse Twist Drills, .50 & 10¢ & 10¢	
Standard, .50 & 10¢ & 10¢	
Cleveland, .50 & 10¢ & 10¢	
Syracuse, for metal, .50 & 10¢ & 10¢	
Syracuse, for wood (wood list), .30¢ & 10¢ & 10¢	
Williams' or Holt's, for metal, .50 & 10¢ & 10¢	
Williams' or Holt's, for wood, .40 & 10¢	

Auger Augers and Bits—	
L'Hommiedieu's, .15¢ & 10¢ @ .15¢ & 10¢	
Watrous', .15¢ & 10¢ @ .15¢ & 10¢	
Snell's, .15¢ & 10¢ @ .15¢ & 10¢	
Snell's Ship Auger Patt' Car Bits, .15¢ & 10¢ @ .15¢ & 10¢	

Awl Holes—	
Sewing, Brass Fer., 2¢ gross, .85¢, .45¢ & 10¢	
Pat. Sewing, Short, \$1.00, 2¢ doz, .40¢ & 10¢	
Pat. Sewing, Long, .2¢ doz \$1.20, 2¢	
Pat. Peg, Plain Top, 2¢ gr \$10.00, .45¢ & 10¢	
Pat. Peg, Leather Top, 2¢ gr \$12.00, .45¢ & 10¢	

Awls, Brad Sets, &c.—	
Aiken's Sets, Awls and Tools, .25¢ & 10¢	
Watrous', .15¢ & 10¢	
Snell's, .15¢ & 10¢	
Snell's Ship Auger Patt' Car Bits, .15¢ & 10¢	

Awl and Tool Sets—	
Fray's Adj. Tool Hds., Nos. 1, \$12.25; 2, \$18.75; 3, \$25.00	
Mackrell's, 2¢ doz \$10.00, .25¢ & 10¢	
Stanley's Excelsior: No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50	
Stanley's, .30¢ & 10¢	

Axes—	
Makers' and Special Brands—	
First quality, .20¢ doz \$6.00 @ \$0.50	
Others, .20¢ doz \$5.50 @ \$0.75	

Axe Grease—	
Fraser's, Keg 2¢ 4¢, Pail 2¢ 5¢	
Fraser's, in boxes, .20¢ doz \$9.50	
Dixon's Everlasting, in boxes, .20¢ doz \$1.20, 2¢ doz \$2.00	
Dixon's Everlasting, .10¢ doz, pails, as 8¢	
Lower grades, special brands, 2¢ gr \$5.50 @ \$7.00	

Axes—	

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Cards—	
Horre & Curry.....	10&10@10&10&10%
Cotton.....	New list, Aug., 1883.
	10@10&10%
Wool.....	New list, Aug., 1883.
	10@10&10%
Carpet Stretchers—	
Cast Steel, Polished.....	22¢
Cast Iron, Steel Points.....	8¢
Socket.....	1.75¢
Bullard's.....	25¢@25&10%
Carpet Sweepers—	
Bissell No. 5.....	\$17.00
Bissell No. 7 New Drop Pan.....	\$19.00
Bissell, Grand.....	36¢
Grand Rapids.....	24¢
Crown Jewel, No. 1, \$18.00; No. 2, \$19.00; No. 3, \$20.00.....	
Magic.....	15¢
Jewel.....	17¢
Improved Parlor Queen, Nickled.....	27¢
Improved Parlor Queen, Japanned.....	24¢
Excelsior.....	22¢
Garland.....	18¢
Parlor Queen.....	24¢
Housewife's Delight.....	15¢
Queen.....	16¢
Queen, with band.....	18¢
King.....	20¢
Wool, Improved.....	18¢
Hub.....	16¢
Cog-Wheel.....	16¢
Conqueror.....	22¢
Easy.....	22¢
Monarch.....	22¢
Goshen.....	21¢
Advance.....	18¢
Ladies' Friend, No. 1, \$15.00; No. 2, \$16.00.....	
American.....	15¢
Grand Republic.....	35¢
Cartridges—	
See Ammunition.	
Casters—	
Bed.....	New list:
Plate.....	Brass, .55¢@5¢&5%
Shallow Socket.....	Others, .06¢@6¢&5%
Deep Socket.....	40&10%
Yale Casters, list May, 1884.....	50&10@40&10%
Yale, Gem.....	.06@6¢@5%
Martin's Patent (Phoenix).....	45&10@50%
Payson's Anti-friction.....	60@60&10%
Giant Truck Casters.....	30¢
Stationary Truck Casters.....	60&10%
Socket Truck Casters.....	50¢
Cattle Leaders—	
Humason, Beckley & Co.'s.....	70¢
Sargent's.....	60@10%
Hotchkiss.....	90¢
Peek, Stow & W. Co.....	50@10%
Chain—	
Trace, 6@10-2, exact, F pair, \$1.03.....	50@10@50@10&5%
Trace, 6@10-3, exact, F pair, \$1.22.....	50@10@50@10&5%
Trace, 7-10-2, exact, F pair, \$1.11.....	50@10@50@10&5%
NOTE.—Traces "Regular" sizes, 3 net pair less than exact.	
Log, Fifth, Stretcher, and other fancy Chains, List Nov. 1, 1884.....	50@10@50@10&5%
American Coll., in cast lots, 3-16 1/4 5-10 7-10 9-10 11-12 13-14 15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34 35-36 37-38 39-40 41-42 43-44 45-46 47-48 49-50 51-52 53-54 55-56 57-58 59-60 61-62 63-64 65-66 67-68 69-70 71-72 73-74 75-76 77-78 79-80 81-82 83-84 85-86 87-88 89-90 91-92 93-94 95-96 97-98 99-100 101-102 103-104 105-106 107-108 109-110 111-112 113-114 115-116 117-118 119-120 121-122 123-124 125-126 127-128 129-130 131-132 133-134 135-136 137-138 139-140 141-142 143-144 145-146 147-148 149-150 151-152 153-154 155-156 157-158 159-160 161-162 163-164 165-166 167-168 169-170 171-172 173-174 175-176 177-178 179-180 181-182 183-184 185-186 187-188 189-190 191-192 193-194 195-196 197-198 199-200 201-202 203-204 205-206 207-208 209-210 211-212 213-214 215-216 217-218 219-220 221-222 223-224 225-226 227-228 229-230 231-232 233-234 235-236 237-238 239-240 241-242 243-244 245-246 247-248 249-250 251-252 253-254 255-256 257-258 259-260 261-262 263-264 265-266 267-268 269-270 271-272 273-274 275-276 277-278 279-280 281-282 283-284 285-286 287-288 289-290 291-292 293-294 295-296 297-298 299-300 301-302 303-304 305-306 307-308 309-310 311-312 313-314 315-316 317-318 319-320 321-322 323-324 325-326 327-328 329-330 331-332 333-334 335-336 337-338 339-340 341-342 343-344 345-346 347-348 349-350 351-352 353-354 355-356 357-358 359-360 361-362 363-364 365-366 367-368 369-370 371-372 373-374 375-376 377-378 379-380 381-382 383-384 385-386 387-388 389-390 391-392 393-394 395-396 397-398 399-400 401-402 403-404 405-406 407-408 409-410 411-412 413-414 415-416 417-418 419-420 421-422 423-424 425-426 427-428 429-430 431-432 433-434 435-436 437-438 439-440 441-442 443-444 445-446 447-448 449-450 451-452 453-454 455-456 457-458 459-460 461-462 463-464 465-466 467-468 469-470 471-472 473-474 475-476 477-478 479-479 480-481 482-483 484-485 486-487 488-489 489-490 491-492 493-494 495-496 497-498 499-500 501-502 503-504 505-506 507-508 509-510 511-512 513-514 515-516 517-518 519-520 521-522 523-524 525-526 527-528 529-530 531-532 533-534 535-536 537-538 539-540 541-542 543-544 545-546 547-548 549-550 551-552 553-554 555-556 557-558 559-560 561-562 563-564 565-566 567-568 569-570 571-572 573-574 575-576 577-578 579-579 580-581 582-583 584-585 586-587 588-589 589-590 591-592 593-594 595-596 597-598 599-600 601-602 603-604 605-606 607-608 609-609 610-611 611-612 613-614 615-616 617-618 618-619 619-620 621-622 623-624 625-626 627-628 629-629 630-631 632-633 634-635 636-637 638-639 639-640 641-642 643-644 645-646 647-648 649-650 651-652 653-654 655-656 657-658 659-660 661-662 663-664 665-666 667-668 669-670 671-672 673-674 675-676 677-678 679-679 680-681 682-683 683-684 685-686 687-688 689-689 690-691 692-693 693-694 695-696 697-698 699-699 700-701 702-703 703-704 705-706 707-708 709-709 710-711 711-712 713-714 714-715 715-716 716-717 717-718 718-719 719-720 721-722 722-723 723-724 724-725 725-726 726-727 727-728 728-729 729-730 731-732 732-733 733-734 734-735 735-736 736-737 737-738 738-739 739-740 741-742 742-743 743-744 744-745 745-746 746-747 747-748 748-749 749-750 751-752 752-753 753-754 754-755 755-756 756-757 757-758 758-759 759-760 761-762 762-763 763-764 764-765 765-766 766-767 767-768 768-769 769-770 771-772 772-773 773-774 774-775 775-776 776-777 777-778 778-779 779-780 781-782 782-783 783-784 784-785 785-786 786-787 787-788 788-789 789-790 791-792 792-793 793-794 794-795 795-796 796-797 797-798 798-799 799-800 801-802 802-803 803-804 804-805 805-806 806-807 807-808 808-809 809-810 811-812 812-813 813-814 814-815 815-816 816-817 817-818 818-819 819-820 821-822 822-823 823-824 824-825 825-826 826-827 827-828 828-829 829-830 831-832 832-833 833-834 834-835 835-836 836-837 837-838 838-839 839-840 841-842 842-843 843-844 844-845 845-846 846-847 847-848 848-849 849-850 851-852 852-853 853-854 854-855 855-856 856-857 857-858 858-859 859-860 861-862 862-863 863-864 864-865 865-866 866-867 867-868 868-869 869-870 871-872 872-873 873-874 874-875 875-876 876-877 877-878 878-879 879-880 881-882 882-883 883-884 884-885 885-886 886-887 887-888 888-889 889-890 891-892 892-893 893-894 894-895 895-896 896-897 897-898 898-899 899-900 901-902 902-903 903-904 904-905 905-906 906-907 907-908 908-909 909-910 911-912 912-913 913-914 914-915 915-916 916-917 917-918 918-919 919-920 921-922 922-923 923-924 924-925 925-926 926-927 927-928 928-929 929-930 931-932 932-933 933-934 934-935 935-936 936-937 937-938 938-939 939-940 941-942 942-943 943-944 944-945 945-946 946-947 947-948 948-949 949-950 951-952 952-953 953-954 954-955 955-956 956-957 957-958 958-959 959-960 961-962 962-963 963-964 964-965 965-966 966-967 967-968 968-969 969-970 971-972 972-973 973-974 974-975 975-976 976-977 977-978 978-979 979-980 981-982 982-983 983-984 984-985 985-986 986-987 987-988 988-989 989-990 991-992 992-993 993-994 994-995 995-996 996-997 997-998 998-999 999-1000	

<i>Cross-Cut Saw Handles</i>	
Atkins' No. 1 Loop, \$ pair, 30¢; No. 3, 22¢; No. 2 and No. 4 Reversible, 22¢; Boynton's Loop Saw Handles, 50¢.	60¢
Champion.	15¢
Hangers	
Barn Door, old patterns	60¢ & 10¢ & 10¢ & 70¢
Barn Door, New England	80¢ & 10¢ & 10¢ & 70¢
Samson Steel Anti-Friction.	55¢
Orleans Steel.	55¢
Hamilton Wrought Wood Track.	55¢
U. S. Wood Track.	65¢
Champion.	60¢ & 10¢
Rider and Wooster, Medina Mfg. Co.'s List.	70¢
Climax Anti-Friction.	60¢
Climax Anti-Friction for Wood Track.	55¢
Zenith for Wood Track.	55¢
Reed's Steel Arm.	50¢
Challenge, Barn Door.	50¢
Sterling's Imp'ed (Anti-Friction).	65¢ & 10¢
Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00.	50¢ & 2¢
Cherite.	50¢ & 10¢
Kidder's.	50¢ & 10¢ & 60¢
The Boss.	60¢ & 10¢
Bell Anti-Friction.	60¢ & 10¢ & 10¢
Duplex (Wood Track).	60¢ & 10¢ & 10¢
Terry's Pat., \$ per doz. pr. 4 in., \$10.00; \$12.00.	50¢ & 50¢ & 50¢ & 10¢
Cronk's Pat., No. 4, \$12.00; No. 5, \$14.40; No. 6, \$18.00.	50¢ & 15¢ & 60¢ & 80¢
Wood Track Iron Clad, 2¢ ft. 10¢.	50¢
Carrier Steel Anti-Friction.	50¢ & 50¢ & 55¢
Architect, \$ set \$6.00.	20¢
Clip.	20¢ & 10¢
Felix.	20¢
Richards'.	30¢ & 30¢ & 10¢
Lane's Steel Anti-Friction.	40¢ & 10¢
Ball Bearing Door Hanger.	20¢ & 10¢ & 25¢ & 10¢
Warner's Pat.	20¢ & 20¢ & 10¢
Stearns' Anti-Friction.	20¢ & 20¢ & 10¢
Stearns' Challenge.	25¢ & 10¢ & 25¢ & 10¢
Faultless.	40¢ & 10¢ & 5¢
American, \$ set \$6.00.	20¢ & 10¢
Rider & Wooster, No. 1, 62¢; No. 2, 75¢.	40¢
Paragon, Nos. 1, 2 and 3.	40¢ & 10¢
Paragon, Nos. 5, 5½, 7 and 8.	20¢ & 10¢
Crescent.	60¢ & 60¢ & 10¢
Nickel, Cast Iron.	50¢
Nickel, Malleable Iron and Steel.	40¢
Sorenson Anti-Friction Single Strap.	35¢
Sorenson Anti-Friction Double Strap.	40¢
Universal Anti-Friction.	25¢
Wild West, 4 in. Wheel, \$10.00.	5¢
Wheel, \$21.00.	45¢
Star.	40¢ & 10¢ & 40¢ & 10¢
May.	50¢ & 50¢ & 10¢
Barry, \$4.00.	40¢ & 10¢
Harness Snaps	
See Snaps.	
Hatches	
List Jan. 1, 1886.	
Isaiah Blood.	35¢ & 10¢
John's Shingling, Lath and Claw.	40¢ & 5¢
Hunt's Broad.	40¢
Buffalo Hammer Co.	40¢ & 10¢ & 50¢
Hurd's.	40¢ & 10¢ & 50¢
Fayette R. Plumb.	40¢ & 10¢ & 50¢
Wm. Mann, Jr. & Co.	50¢ & 50¢ & 55¢
Underhill Edge Tool Co.	40¢ & 5¢ & 10¢ & 10¢
Underhill's, Haines and Bright.	33¢
C. Hammond & Son.	40¢ & 10¢ & 50¢
Simmons'.	40¢ & 10¢ & 50¢
Peck's.	40¢ & 10¢ & 40¢ & 10¢
Kelly's.	50¢ & 50¢ & 55¢
Sargent & Co.	50¢
Ten Eyck Edge Tool Co.	40¢ & 10¢ & 10¢
Collins.	10¢
Hay and Straw Knives	
Lightning. Mfrs' price \$ per doz \$18.00, 25¢ But jobbers frequently give extras.	
Gem.	\$ per doz \$10
Wadsworth's.	40¢ & 7¢ & 10¢ & 10¢
Carter's Needle.	\$ per doz \$1.50 & \$12.00
Heath's.	\$ per doz \$13.50 & \$14.00
Auburn Hay, Com. and Spear Point.	50¢
Auburn, Straw.	40¢
Nolin's Hay.	\$ per doz \$10.00
Hinges	
Wrought Iron Hinges	
Trap and T.	75¢ & 75¢ & 5¢
Screw Hook and Strap.	6 to 12 in., \$ per doz
Heavy Welded Hook.	6 to 12 in., \$ per doz
Screw Hook and Eye.	6 in., \$ per doz \$2.45; 10¢ & 5¢ in., \$ per doz \$3.00
Rolled Blind Hinges, Nos. 32 and 34.	50¢ & 10¢
Rolled Blind Hinges, Nos. 232 and 234.	55¢ & 10¢
Rolled Plate.	70¢ & 10¢
Rolled Raised.	70¢ & 10¢
Plate Hinges 18, 10 & 12 in., \$ per doz	55¢
"Providence" over 12 in., \$ per doz	4¢
Spring Hinges	
Geer's Spring and Blank Butts.	40¢
Union Spring Hinge Co.'s list, March, 1886.	20¢
Acme and U. S.	30¢
Empire and Crown.	20¢
Hero and Monarch.	50¢
American, Gem, and Star, Japanned.	20¢
American, Gem, and Star, Bronzed.	20¢
Oxford, Bronze and Brass.	20¢
Barker's Double Acting.	20¢ & 10¢
Bommer's.	25¢
Bukman's.	30¢
Chicago.	30¢
Wiles'.	10¢
Devore's.	40¢
Rex.	40¢
Royal.	60¢
Reliable.	60¢
Champion.	60¢
Date Hinges	
Western.	\$ per doz \$4.40, 60¢
N. E.	\$ per doz \$7.00, 55¢
N. E. Reversible.	\$ per doz \$5.20, 55¢ & 10¢
Clark's, Nos. 1, 2, 3.	\$ per doz \$6.10, 55¢
N. Y. State.	\$ per doz \$5.00, 55¢ & 10¢
Automatic.	\$ per doz \$12.50, 50¢
Common Sense.	\$ per doz \$4.50, 50¢
Seymour's.	\$ per doz \$4.50, 50¢ & 10¢
Shepard's.	\$ per doz \$6.10, 55¢
Reed's Latch and Hinges.	\$ per doz \$12.00, 50¢
Blind Hinges	
Parker.	75¢ & 2¢
Palmer.	50¢ & 5¢ & 10¢
Seymour.	70¢ & 2¢
Nicholson.	55¢ & 10¢
Huffer.	60¢
Clasp Hinges	
Clark's, Nos. 1, 2, 3.	\$ per doz \$6.10, 55¢
N. Y. State.	\$ per doz \$5.00, 55¢ & 10¢
Automatic.	\$ per doz \$12.50, 50¢
Common Sense.	\$ per doz \$4.50, 50¢
Seymour's.	\$ per doz \$4.50, 50¢ & 10¢
Shepard's.	\$ per doz \$6.10, 55¢
Reed's Latch and Hinges.	\$ per doz \$12.00, 50¢
Clasp Hinges	
Clark's, Nos. 1, 2, 3.	\$ per doz \$6.10, 55¢
N. Y. State.	\$ per doz \$5.00, 55¢ & 10¢
Automatic.	\$ per doz \$12.50, 50¢
Common Sense.	\$ per doz \$4.50, 50¢
Seymour's.	\$ per doz \$4.50, 50¢ & 10¢
Shepard's.	\$ per doz \$6.10, 55¢
Reed's Latch and Hinges.	\$ per doz \$12.00, 50¢
Clasp Hinges	
Parker.	75¢ & 2¢
Palmer.	50¢ & 5¢ & 10¢
Seymour.	70¢ & 2¢
Nicholson.	55¢ & 10¢
Huffer.	60¢
Clasp Hinges	
Parker.	75¢ & 2¢
Palmer.	50¢ & 5¢ & 10¢
Seymour.	70¢ & 2¢
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Huffer.	60¢
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Huffer.	60¢
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Parker.	75¢ & 2¢
Palmer.	50¢ & 5¢ & 10¢

Molasses Gates—	Plane Irons—	Razors—	Atkins' Silver Steel Diamond X Cuts
Stebbin's Pat. 70@70@71%	Plane Irons 20@10%	J. R. Torrey Razor Co. 20%	foot 70#
Stebbin's Genuine 60@10@10%	Plane Irons, Butcher's \$5.00@5.25 to 2	Wostenholme and Butcher, \$10.00 to 2,	foot 50#
Stebbin's Tinned Ends 40@10%	Plane Irons, Buck Bros. 30%	10x	Atkins' Special Steel Diamond X Cut
Chase's Hard Metal 50@10%	Plane Irons, Auburn Tool Co., "This-		foot 30#
Bush's. 20%	tie."		Atkins' Champion and Electric Tooth
Lincoln's Pattern 70@70@10	Sandusky Tool Co.: Single and Cut. 30%	X Cuts. 20@10@5%	X Cuts. 20@10@5%
Weed's. 20@10%	Double. 40%	Torrey's. 20%	Atkins' Hollow Back X Cuts. 27@18#
Boss. P doz:	L. & I. J. White. 25%	Badger's Belt and Com. 20	Atkins' Mulay Mill and Drag. 40%
Nos. 1, \$7; No. 2, \$8; No. 3, \$9; No. 4, \$10. 60@10@10%		Lamont Combination. 20	W. M. & C. Hand. 30@5@30@10%
Money Drawers.... P doz, \$18@20			W. M. & C. Champion X Cuts, Regu-
Muzzles—			lar. 24@26#
Safety. P doz, \$3.00, 25%			W. M. & C. X Cuts, Thin Back. 27@29#
Nails, see Trade Report.			Peace Circular and Mill. 45@10%
Wire Nails & Brads, list July 14, '87			Peace Hand Panel and Rip. 20@10@20@10@10%
70@10%			Peace Cross Cuts, Standard. 20@10@5%
Wire Nails, Standard Penny. P keg \$2.50@2.60			Peace Cross Cuts, Thin Back. 27@28#
Nail Puller—			Richardson's Circular and Mill. 45@45@10%
Curtiss Hammer. P doz \$9, net			Richardson's X Cuts, No. 1, 39¢; No. 2, 27¢; No. 3, 24¢
Giant, No. 1. \$30.00, 10%			Hack Saws—
Pelican. P doz, \$9.00, 25%			Griffin's, complete. 40@10@5%
Boss. P doz, \$30.00, 30%			Griffin's Hack Saws and Blades. 40@10@5@10%
Lightning. P doz \$21.00			Star Hack Saws and Blades. 25%
Nail Sets—			Diamond Hack Saws and Blades. 25%
Square. P gr, \$4.00@4.25			Eureka and Crescent. 25%
Round. P gr, \$3.25			Saw Frames—
Cannon's Diamond Point. P gr, \$12, 20%			White Vermont. P gro \$9.00@10.00
Nut Crackers—			Red, Polished and Varnished. P doz \$1.50, 25%
Table (H. & B. Mfg. Co.). 40%			Saw Sets—
Blake's Pattern. P doz \$2.00, 10%			Stillman's Genuine. P doz \$5.00@7.75, 40@5%
Turner & Seymour Mfg. Co. 50%			Stillman's Imita. P doz \$3.25@5.25, 40@5%
Nuts—			Common Lever. P doz \$2.00, 40@5%
Nuts, off list Jan. 1, 1888: Square, Hex.			Morrill's No. 1, \$15.00; Nos. 3&4, \$24.00, 40@10@5@50%
Hot Pressed. 5.4¢ 5.9¢			Lench's. No. 0, \$8.00; No. 1, \$15, 15@20%
Cold Punched. 5.4¢ 5.9¢			Nash's. 20@10@20@10@10%
In lots less than 100 lb. P. & B. add 1¢; 1 lb. boxes, add 1¢ to list.			Hammer, Hotchkiss. 55.50, dis 10%
Oakum—			Hammer, Bemis & Call Co.'s new Pat. 30@5%
Government. P. b 73¢ @8¢			Bemis & Call Co.'s Lever and Spring. 30@5%
U. S. Navy. P. b 63¢ @7¢			Bemis & Call Co.'s Plate. 12.5¢
Navy. P. b 53¢ @6.5¢			Hack Saws—
Oilers—			Atkin's Criterion. P doz \$7.50
Zinc and Tin. 65@65@10%			Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00, 40@10% \$24.00. 40@10@50%
Brass and Copper. 50@10@5@10@5%			Avery's Saw Set and Punch. 40%
Malleable, Hammers Improved. 10¢; No. 1, \$3.60; No. 2, \$4.00; No. 3, \$4.40 P doz, 10@10@10%			Am. Tool Co.'s Superior. P doz \$15, 50%
Malleable, Hammers, Old Pattern, same list. 40%			
Prior's Pat. or "Paragon" Zinc. 60@10@10%			
Prior's Pat. or "Paragon" Brass. 50%			
Olinstead's Tin and Zinc. 60%			
Olinstead's Brass and Copper. 50%			
Broughton's Zinc. 60%			
Broughton's Brass. 50%			
Packing, Steam—			
Rubber—			
Standard. 60@10@60@10@10%			
Extra. 50@10@60%			
N. Y. B. & P. Co., Standard. 50@10@5%			
N. Y. B. & P. Co., Empire. 70%			
N. Y. B. & P. Co., Salamander. P. b 65¢, 30%			
Jenkins' Standard. P. b 80¢, 35%			
Miscellaneous—			
American Packing. 10@11¢ P. b			
Russia Packing. 14¢ P. b			
Italian Packing. 13@14¢ P. b			
Cotton Packing. 15@16@17¢ P. b			
Jute. 7@8¢ P. b			
Padlocks—			
See Locks.			
Pails—			
Galvanized Iron—			
Quarts. 10 12 14			
Hill's Light Weight. P. doz, \$2.75 3.00 3.25			
Hill's Heavy Weight. 3.00 3.25 3.75			
Whitney's. 2.75 3.00 3.25			
Sidney Shephard & Co. 2.89 3.00 3.40			
Iron Claw. 2.75 3.00 3.25			
Fire Buckets. 2.75 3.25 3.50			
Buckets, see Well Buckets.			
Indurated Fibre Ware—			
Star Pails, 12 qt. P doz \$4.50			
Fire, Stable and Milk, 14 qt. P doz \$5.85			
Pencils—			
Faber's Carpenters'. high list 50¢			
Faber's Round Gilt. P. gro \$5.25			
Dixon's Lead. P. gro \$4.50			
Dixon's Lumber. P. gro \$6.75			
Dixon's Carpenters'. 40@10%			
Picks—			
Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00. 60@5@60@10%			
Picture Nails—			
Brass Head, Sargent's list. 50@10@10%			
Bronze Head, Combination Hat. 50@10@10%			
Porcelain Head, Sargent's list. 50@10@10%			
Porcelain Head, Combination list. 40@10%			
Niles' Patent. 40%			
Pinking Irons— P doz 65¢ net			
Pipe, Wrought Iron—			
List March 23, 1887.			
1 1/2 and under, Plain. 55¢			
1 1/2 and under, Galvanized. 55¢			
1 1/2 and over, Plain. 65@21¢			
1 1/2 and over, Galvanized. 55@21¢			
Boiler Tubes, Iron. 60@21¢			
Planes and Plane Irons—			
Wood Planes—			
Molding. 50@5@5@10%			
Bench, First Quality. 60@6@6@5%			
Bench, Second Quality. 60@10@6@10@10%			
Bailey's (Stanley R. & L. Co.). 40@10%			
Iron Planes—			
Bailey's (Stanley R. & L. Co.). 40@10%			
Miscellaneous Planes (Stanley R. & L. Co.). 20@10%			
Victor Planes, Stanley R. & L. Co. 20@10%			
Steer's Iron Planes. 25@35@5%			
Meriden M. I. C. Co. 30@10@30@10@10%			
Davis's Iron Planes. 30@10@30@10@10%			
Birmingham Plane Co. 50@25@5@5%			
Gage Tool Co.'s Self-Setting. 20@10%			
Chaplin's Iron Planes. 40@40@5%			
Sargent's. 30@10@30@10@10%			
Rakes—			
Cast Steel, Association goods. 65¢			
Cast Steel, outside goods. 60@10@70¢			
Maltese Rake. 70¢@70¢			
Gibbs Lawn Rake. \$12.50			
Canton Lawn Rake. \$6.00, 50%			
Ft. Madison Prize Bow Brace and Peerless. 65¢			
Fort Madison Steel Tooth Lawn Rake. 20@10@30%			
Silver's. 40@10%			
Saws—			
Wood Saws—			
Disston's Circular. 45@45@5% Extras sometimes given			
Disston's Cross Cuts. 45@45@5% by jobbers.			
Disston's Hand 25@25@5% Extras			
Atkins' Circular Shingle and Heading 50@10% often given			
Flat Head Iron. 50% by jobbers			
Round Head Iron. 40% by jobbers			
Flat Head Brass. 45% by jobbers			
Round Head Brass. 35% by jobbers			
Flat Head Bronze. 45% by jobbers			
Round Head Bronze. 35% by jobbers			

Machines—	
Flat Head, Iron.....	55¢
Round Head, Iron.....	50¢
Bench and Hand—	
Bench, Iron.....	55¢ to 10¢
Bench, Wood, Beech.....	\$2.25
Bench, Wood, Hickory.....	20¢ to 10¢
Hand, Wood.....	25¢ to 10¢
Lag, Blunt Point.....	75¢ to 10¢
Coach and Lag, Gimlet Point.....	75¢
Bed.....	25¢ to 50¢
Hair Rail, Sargent's.....	60¢ to 10¢
Hand Rail, A. & B. Mfg. Co., 70¢ to 10¢	
Hand Rail, Ains. Screw Co., 75¢	
Ives', No. 1, \$15.00; No. 2, \$12.00	75¢ to 10¢
Jack Screws, Millers Falls List.....	50¢ to 50¢
Jack Screws, P. S. & W.....	35¢
Jack Screws, Sargent.....	60¢ to 10¢
Jack Screws, Stearns'.....	40¢ to 40¢
Scroll Saws—	
Lester, complete, \$10.00.....	25¢
Rogers, complete, \$4.00.....	25¢
Barnes' Builders' and Cabinet Makers'.....	25¢
\$15.....	25¢
Barnes' Scroll Saw Blades.....	35¢
Scythe Snaths—	50¢ to 25¢
Shears—	
American (Cast) Iron.....	75¢ to 10¢
Pruning—See Pruning Hooks and Shears.	
Barnard's Lamp Trimmers.....	75¢ to 10¢
Tinners'.....	20¢ to 25¢
Seymour's, List, Dec., 1881.	
60¢ to 10¢	
Heinisch's, List, Dec., 1881.	
60¢ to 10¢	
Heinisch's Tailor's Shears.....	35¢ to 50¢
First quality C. S. Trimmers.....	80¢ to 10¢
Second quality C. S. Trimmers.....	80¢ to 10¢
Acme Cast Shears.....	10¢ to 10¢
Diamond Cast Shears.....	10¢
Clipper.....	10¢ to 10¢
Victor Cast Shears.....	75¢ to 10¢
Hove Bros. & Hubert, Solid Forged Steel.....	40¢
Chicago, Drop Forge & F. Co., Solid Steel Forged.....	60¢
Clauss Shear Co., Japanned.....	70¢
Clauss Shear Co., Nickled, same list, 60¢	
Sheaves—	
Sliding Door—	
M. W. Co., List July, 1888.....	50¢ to 10¢
R. & E. list Dec. 18, 1885.....	55¢ to 20¢
Corbin's list.....	60¢ to 10¢
Patent Roller.....	60¢ to 10¢
Patent Roller, Hatfield's.....	75¢
Russell's Anti-Friction, list Dec. 18, 1885.....	60¢ to 25¢
Moore's Anti-Friction.....	50¢
Sliding Shutter—	
R. & E. list Dec. 18, 1885.....	60¢ to 10¢
Sargent's list.....	60¢ to 10¢
Reading list.....	60¢ to 10¢
Ship Tools—	
L. & I. J. White.....	20¢ to 5¢
Albertson Mfg. Co.....	25¢
Shoes, Horse, Mule, &c.—	
Horse—	
Burden's, Perkins', Phoenix, at factory.....	\$4.00
Mule—	
Add \$1 to keg to above prices.	
Or, Wrought—	
Ton lots.....	75¢ to 9¢
1000 lb. lots.....	75¢ to 8¢
500 lb. lots.....	75¢ to 10¢
Shot—	
(Eastern prices 2¢ off, cash, 5 days.)	
Drop, 75¢ bag, 25 lb.....	\$1.20
Drop, 75¢ bag, 5 lb.....	25¢
Buck and Chilled, 75¢ bag.....	1.45
Buck and Chilled, 75¢ bag.....	34¢
Shovels and Spades—	
Ames' Shovels, Spades, &c., list Nov. 1, 1885.....	20¢
Note—Jobbers frequently give 5¢ to 25¢ extra on above.	
Griffith's Black Iron.....	50¢ to 10¢
Griffith's C. S. 60¢ to 60¢ to 10¢	
Old Colony (Sanford Fork & Tool Co.) 20¢	
St. Louis Shovel Co. 20¢ to 20¢ to 10¢	
Hussey, Binns & Co. 15¢ to 25¢	
Hubbard & Co. 20¢ to 20¢ to 10¢	
Lehigh Mfg. Co. 50¢ to 10¢	
Payne Pettebone & Son, list January, 1886.....	30¢
Remington's (Lowman's Patent) 30¢ to 10¢	
Rowland's, Black Iron.....	50¢ to 10¢
Rowland's Steel.....	60¢ to 60¢ to 10¢
Shovels and Tonga—	
Iron Head.....	60¢ to 10¢
Brass Head.....	60¢ to 10¢ to 10¢
Skeins, Thimble—	
Western list.....	75¢ to 75¢ to 10¢
Columbus Wrt. Steel, list Nov. 1, 1887, 20¢	
Coldbrookdale Iron Co. 50¢ to 10¢	
Utica P. S. T. Skeins.....	60¢
Utica Turned and Fitted.....	35¢
Sieves—	
Buffalo Metallic, S. S. & Co. 50¢ to 25¢ to 10¢	
Barler Flour Sifters.....	75¢ to 20¢
Electric.....	75¢ to 20¢
Hunter's.....	75¢ to 18¢
Smith's Adjustable Sifters.....	75¢ to 20¢
Smith's Adjustable Milk Strainer.....	75¢ to 20¢
Smith's Adjustable T. & C. Strainer.....	75¢ to 20¢
Steves, Wooden Rim—	
Iron, Plated.....	
Mesh 18, Nested, 75¢ doz. 70¢ to 90¢	
Mesh 20, Nested, 75¢ doz. 85¢ to 100¢	
Mesh 24, Nested, 75¢ doz. \$1.00 to 1.10	
Slates—	
School, by case.....	50¢ to 10¢
Snaps, Harness, &c.—	
Anchor (T. & S. Mfg. Co.).....	65¢
Fitch's (Bristol).....	50¢ to 10¢
Hotchkiss.....	10¢
Andrews.....	50¢
Sargent's Patent Guarded.....	70¢ to 10¢ to 10¢
German, new list.....	40¢ to 10¢
Covert.....	50¢ to 25¢
Covert, New Patent.....	50¢ to 25¢
Covert, New R. E. 60¢ to 25¢	
Covered Spring.....	60¢ to 10¢ to 10¢
Soldering Irons—	
Covert's Adjustable, list Jan. 1, 1886.....	35¢ to 25¢
Spoke Shaves—	
Iron.....	45¢
Wood.....	30¢
Bailey's (Stanley R. & L. Co.) 40¢ to 10¢	
Stearns' 20¢ to 10¢ to 30¢	
Spoke Trimmers—	
Bonney's.....	75¢ to 10¢ to 10¢
Stearns' 20¢ to 10¢ to 10¢	
Ives', No. 1, \$15.00; No. 2, \$12.00	75¢ to 10¢ to 10¢
Jack Screws, Millers Falls List.....	50¢ to 50¢
Jack Screws, P. S. & W. 35¢	
Jack Screws, Sargent.....	60¢ to 10¢ to 10¢
Jack Screws, Stearns' 40¢ to 40¢ to 10¢	
Scroll Saws—	
Lester, complete, \$10.00.....	25¢
Rogers, complete, \$4.00.....	25¢
Barnes' Builders' and Cabinet Makers'.....	25¢
\$15.....	25¢
Barnes' Scroll Saw Blades.....	35¢
Scythe Snaths—	50¢ to 25¢
Shears—	
American (Cast) Iron.....	75¢ to 10¢ to 10¢
Pruning—See Pruning Hooks and Shears.	
Barnard's Lamp Trimmers.....	75¢ to 10¢
Tinners'.....	20¢ to 25¢
Seymour's, List, Dec., 1881.	
60¢ to 10¢ to 10¢	
Heinisch's, List, Dec., 1881.	
60¢ to 10¢ to 10¢	
Heinisch's Tailor's Shears.....	35¢ to 50¢
First quality C. S. Trimmers.....	80¢ to 10¢
Second quality C. S. Trimmers.....	80¢ to 10¢ to 10¢
Acme Cast Shears.....	10¢ to 10¢
Diamond Cast Shears.....	10¢
Clipper.....	10¢ to 10¢
Victor Cast Shears.....	75¢ to 10¢ to 10¢
Hove Bros. & Hubert, Solid Forged Steel.....	40¢
Chicago, Drop Forge & F. Co., Solid Steel Forged.....	60¢
Clauss Shear Co., Japanned.....	70¢
Clauss Shear Co., Nickled, same list, 60¢	
Squares—	
Steel and Iron.....	75¢ to 10¢ to 80¢
Nickel-Plated.....	
Tin Case.....	80¢ to 80¢ to 10¢
Spring—	
Elliptic, Concord, Platform and Half Scroll.....	60¢ to 60¢ to 5¢
Cliff's Bolster Springs.....	25¢
Squares—	
Steel and Iron.....	75¢ to 10¢ to 80¢
Nickel-Plated.....	
Tin Case.....	80¢ to 80¢ to 10¢
Thermometers—	
Tin Case.....	80¢ to 80¢ to 10¢
Thimble Skeins—	See Skeins.
Ties, Bale—Steel	
Common and Patent Brads, 70¢ to 10¢ to 70¢ to 10¢	
Hungarian Nails.....	70¢ to 10¢ to 70¢ to 10¢
Chair Nails.....	70¢ to 10¢ to 70¢ to 10¢
Zinc Glazier Points.....	50¢ to 50¢ to 5¢
Cigar Box Nails.....	50¢ to 50¢ to 50¢ to 10¢ to 5¢
Picture-Frame Points.....	50¢ to 50¢ to 50¢ to 10¢ to 5¢
Looking-Glass Tacks.....	50¢ to 10¢ to 50¢ to 10¢ to 5¢
Leathered Carpet.....	50¢ to 10¢ to 50¢ to 10¢ to 5¢
Brush Tacks.....	50¢ to 10¢ to 50¢ to 10¢ to 5¢
Shoe Finders, List Jan. 2, 1888, 10¢ to 10¢ to 5¢	
Lining and Saddle Nails, List Jan. 1, 1886	
Silvered.....	30¢ to 10¢ to 10¢
Japanned.....	20¢ to 10¢ to 10¢
Double-Pointed Tacks.....	85¢
Wire Carpet Tacks.....	50¢ to 10¢ to 10¢
Wire Brad's and Nails—see Nails, Wire	
Steel-Wire Brads, R. & E. Mfg. Co.'s list.....	50¢ to 10¢ to 10¢
Parker's.	20¢ to 25¢
Wilson's.....	55¢
Bowdow's.....	40¢ to 10¢
Brockley's.....	40¢ to 10¢
Miller's Falls.....	40¢ to 10¢ to 10¢
Trenton.....	40¢ to 5¢ to 40¢ to 10¢
Merrill's.....	15¢ to 20¢
Sargent's.....	60¢ to 10¢ to 10¢
Backus and Union.....	40¢
Double Screw Leg.....	15¢ to 10¢
Prentiss.....	20¢ to 25¢
Simpson's Adjustable.....	40¢
Moore's.....	20¢ to 25¢
Saw Fliers—	
Bonney's, Nos. 2 & 3, \$15.00.....	40¢ to 10¢
Stearn's.....	33¢ to 10¢ to 33¢ to 10¢ to 10¢
Stearn's Silent Saw Vises.....	33¢ to 35¢
Sargent's.....	60¢ to 10¢ to 10¢
Hopkins'.....	30¢ to \$17.50, 10¢
Reading.....	40¢ to 10¢
Wentworth.....	20¢ to 10¢
Combination Hand Vises.....	\$4 to \$42.00
Cowell Hand Vises.....	20¢
Bauer's Pipe Vises.....	10¢
Wagon Boxes—	
Per do.....	25¢
Wagon Jacks—	
Daisy.....	Per do \$4.00, 25¢
Washer Cutters—	
Smith's Pat.....	Per do \$12.00, 20¢ to 10¢ to 10¢
Johnson's.....	Per do \$11.00, 33¢ to 5¢
Penny's, \$100 per do. \$14; Jap'd, \$10.00, 55¢	
Appleton's.....	Per do \$16.00, 60¢ to 10¢
Bonney's.....	30¢ to 10¢
Washers—	
Size.....	1 1/2 3/4 1 1/4 5/8 1/2
Washers.....	7 5/8 4/8 3/4 3/4 3/4 3/4
In lots less than 200 lb., \$1 lb., add 1¢, 5¢ to boxes 1¢ to list.	
Wedges—	
Iron.....	75¢ to 35¢
Steel.....	75¢ to 4¢
Well Buckets, Galvanized—	
Hill's.....	Per do, 12 qt. \$4.25; 14 qt. \$5.25
Iron Clad.....	Per do, 14 qt. \$4.25 to 4.50
Whiting's Flat Iron Band.....	\$4.25 to 4.50
Whiting's Wired Top.....	Per do \$4.00 to 4.25
Well Wheels—	
8 in., \$2.25; 10 in., \$2.70; 12 in., \$3.25	
Wire—	
Iron—	
Market, Br. & Ann., Nos. 0 to 18.....	70¢ to 10¢ to 75¢
Cop'd, Nos. 0 to 18.....	70¢ to 70¢ to 5¢
Galv., Nos. 0 to 18.....	65¢ to 5¢
Tin'd, Tinned list Nos. 0 to 18.....	67¢ to 5¢
Stone, Br. and Ann'd, Nos. 16 to 18, 72¢ to 10¢ to 10¢	
Br. and Ann'd, Nos. 16 to 18, 72¢ to 10¢ to 10¢	
Bright and Ann'd, Nos. 19 to 26, 75¢ to 10¢ to 10¢	
Br. and Ann'd, Nos. 27 to 36, 75¢ to 10¢ to 10¢	
Tinned.....	70¢ to 70¢ to 10¢ to 10¢
Galvanized Fence—	
Galvanized Fence, Nos. 8 and 9.....	65¢
Annealed Grape, Nos. 10 to 14.....	75¢
Barbed Wire, Nos. 15 to 18, 1884.....	15¢ to 20¢
Copper, list Jan. 18, 1884.....	25¢
Barb Fence.....	See Trade Report
Wire on Spools.....	65¢
Malin's Steel and Tin'd Wire on Spools.....	40¢
Cast Steel Wire—	
Cast Steel Wire.....	50¢
Stub's Steel Wire.....	\$6.00 to 2¢, 30¢
Steel Music Wire, Nos. 12 to 30, 55¢	Per do
Picture Wire.....	New list, 50¢
Barb Wire Safety Guards, 1000, \$9.00, 25¢	
Wire Clothes Lines, see Lines.	
Wire Cloth, Netting, &c.—	
Painted Screen Cloth, good quality, \$1.80 to \$1.90	
Galvanized Wire Netting.....	70¢ to 70¢ to 5¢
Wire Goods—	
See Bright Wire Goods.	
Wire Rope—	
List May 1, 1886.	
Iron.....	30¢
Cast Steel.....	40¢
Wrenches—	
American Adjustable.....	40¢
Baxter's Adjustable "S".....	40¢ to 10¢ to 50¢
Baxter's Diagonal.....	40¢ to 10¢ to 50¢
Coe's Genuine.....	55¢ to 3¢
Coe's "Mechanics".....	55¢ to 10¢ to 3¢
Girard Standard.....	70¢ to 10¢
Machinists', Sterling Wrench Co., 70¢ to 10¢	
Lamson & Sessions' Engineers'.....	60¢ to 10¢
Lamson & Sessions' Standard.....	70¢ to 10¢
Goes' Pattern, Wrought.....	
Girard Agricultural.....	
Lamson & Sessions' Agric'l.....	80¢ to 80¢ to 5¢
Sterling Wrought.	
Benni's and Call's	
Pat. Combination.....	35¢
Merrick's Pattern.....	35¢
Brig's Pattern.....	25¢
Conqueror Gas Pipe.....	40¢ to 5¢
No. 3 Pipe.....	40¢ to 10¢
Aiken's Pocket (Bright).....	\$6.00 to 40¢ to 10¢
The Favorite Pocket.....	70¢ to 40¢ to 40¢
Webster's Pat. Combination.....	25¢ to 5¢
Boardman's.....	20¢ to 10¢
Always Ready.....	25¢ to 5¢
Alligator.....	50¢
Donohue's Engineer.....	20¢ to 10¢
Acme, Bright.....	60¢ to 3¢
Acme, Nickel.....	50¢ to 3¢
Walker's.....	55¢ to 3¢
Diamond Steel.....	55¢ to 3¢
Wringer, Clothes—	
List Jan., 1889, \$3.00 off.	
Wrought Goods—	
Staples, Hooks, &c., list Jan. 12, 1886.	80¢ to 80¢ to 25¢

CURRENT METAL PRICES.

MARCH 13, 1889.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
$\frac{3}{4}$ to 2 in. round and square...	1 lb 1.90 @ ...
1 to 6 in. x $\frac{3}{4}$ to 1 in.	
Refined Iron:	
$\frac{3}{4}$ to 2 in. round and square...	1 lb 2.00 @ 2.10
1 to 4 in. x $\frac{3}{4}$ to 1 $\frac{1}{2}$ in.	
4 to 6 in. x $\frac{3}{4}$ to 1 in.	1 lb 2.20 @ 2.30
Rods— $\frac{3}{4}$ and 1 $\frac{1}{2}$ round and sq. 1 lb 2.10 @ 2.20	
Bands—1 to 6 x 3 $\frac{1}{2}$ to No. 12. 1 lb 2.20 @ 2.30	
"Burden Best" Iron, base price. 1 lb 3.00 @ ...	
Burden's "H. B. & S." Iron, base price. 1 lb 2.80 @ ...	
"Ulster" 1 lb 3.10 @ ...	
Norway Rods 4.00 @ 5.00	

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery, For Calt, Tire and Sleigh Shoe, base price in small lots	2 $\frac{1}{4}$
Best Cast Steel, base price in small lots	3 $\frac{1}{4}$
Best Cast Steel Machinery, base price in small lots	5 $\frac{1}{4}$

Sheet Iron from Store.

Common American. R. G. Cleaned.	
10 to 16. 2 lb 2.75 @ 2.80	3.25 @ ...
17 to 20. 2 lb 2.85 @ 3.00	3.25 @ ...
21 to 24. 2 lb 3.00 @ 3.10	3.50 @ ...
25 and 30. 2 lb 3.20 @ ...	3.50 @ ...
27. 2 lb 3.35 @ 3.37	3.75 @ ...
28. 2 lb 3.50 @ ...	4.00 @ ...
B. R.	2d qual.
Galv'd, 14 to 20. 2 lb 4.50 @ ...	4.88 @ ...
Galv'd, 1 to 24. 2 lb 4.87	4.75 @ ...
Galv'd, 25 to 30. 2 lb 5.25 @ ...	5.12 @ ...
Galv'd, 27. 2 lb 5.62	5.48 @ ...
Galv'd, 28. 2 lb 6.00 @ ...	5.85 @ ...
Patent Planished. 2 lb A 10 $\frac{1}{2}$ B. 9 $\frac{1}{2}$	
Russia. 2 lb B 10 $\frac{1}{2}$ @ 10 $\frac{1}{2}$	
American Cold Rolled B. B. 2 lb B 5 $\frac{1}{2}$ @ 7 $\frac{1}{2}$	

English Steel from Store.

Best Cast	2 lb 15 @ ...
Extra Cast	2 lb 16 $\frac{1}{2}$ @ 17
Swaged, Cast.	2 lb 16 @ ...
Best Double Shear	2 lb 15 @ ...
Blister, 1st quality	2 lb 12 $\frac{1}{2}$
German Steel, Best	2 lb 10 @ ...
2d quality.	2 lb 9 @ ...
3d quality.	2 lb 8 @ ...
Sheet Cast Steel, 1st quality	2 lb 15 @ ...
2d quality.	2 lb 14 @ ...
3d quality.	2 lb 12 $\frac{1}{2}$

METALS.

Tin.

Per lb	
Banca, Pigs.	23 $\frac{1}{4}$
Straits, Pigs.	23 @ ...
English, Pigs.	23 $\frac{1}{4}$
Straits in Bars.	24 @ ...

Tin Plates.

Charcoal Plates.—Bright.	Per box.
Melyn Grade:	
" 1C. 10 x 14. \$5.75	2 lb 6.00
" 1C. 12 x 12. 6.00	6.25
" 1C. 14 x 20. 5.75	6.00
" 1C. 20 x 28. 12.00	12.50
" 1X. 10 x 14. 7.25	7.50
" 1X. 12 x 12. 7.50	7.75
" 1X. 14 x 20. 7.25	7.50
" 1X. 20 x 28. 15.00	15.50
" DC. 12 $\frac{1}{2}$ x 17. 5.50	5.75
" DX. 12 $\frac{1}{2}$ x 17. 7.00	7.25
Call and Grade:	
" 1C. 10 x 14. 5.75	6.00
" 1C. 12 x 12. 6.00	6.25
" 1C. 14 x 20. 5.75	6.00
" 1X. 10 x 14. 7.25	7.50
" 1X. 12 x 12. 7.50	7.75
" 1X. 14 x 20. 7.25	7.50
" 1X. 20 x 28. 12.00	12.50
" DC. 12 $\frac{1}{2}$ x 17. 4.75	5.00
" DX. 12 $\frac{1}{2}$ x 17. 5.75	6.00
Allaway Grade:	
" 1C. 10 x 14. 5.00	5.12 $\frac{1}{2}$
" 1C. 12 x 12. 5.12 $\frac{1}{2}$	5.25
" 1C. 14 x 20. 5.00	5.12 $\frac{1}{2}$
" 1C. 20 x 28. 11.00	11.50
" IX. 10 x 14. 6.00	6.00
" IX. 12 x 12. 6.25	6.00
" IX. 14 x 20. 6.00	6.00
" IX. 20 x 28. 12.00	12.00
" DC. 12 $\frac{1}{2}$ x 17. 4.75	5.00
" DX. 12 $\frac{1}{2}$ x 17. 5.75	6.00
Coke Plates.—Bright.	
Steel Coke.—1C. 10 x 14, 14 x 20. \$4.75	2 lb 5.00
" 10 x 20. 7.25	7.50
" 20 x 28. 9.75	10.25
" IX. 10 x 14, 14 x 20. 5.60	5.75
" IX. 10 x 14, 14 x 20. 4.40	4.60
Charcoal Plates.—Terne.	
Dean Grade.—1C. 14 x 20. \$4.40	2 lb 4.62 $\frac{1}{2}$
" 20 x 28. 9.00	9.25
" IX. 14 x 20. 4.40	5.62 $\frac{1}{2}$
" 20 x 28. 11.00	11.87 $\frac{1}{2}$
Abecarne Grade.—1C. 14 x 20. 4.25	4.50
" 20 x 28. 8.00	9.00
" IX. 14 x 20. 5.25	5.50
" 20 x 28. 10.50	10.80
Tin Boiler Plates.	
1XX. 14 x 26. 112 sheets.	\$12.50 @ 12 $\frac{1}{2}$
1XX. 14 x 28. 112 sheets.	12.75 @ ...
1XX. 14 x 31. 112 sheets.	14.25 @ ...

Copper.

DUTY: Pig, Bar and Ingot. 4 $\frac{1}{2}$; Old Copper, 3 $\frac{1}{2}$	3 $\frac{1}{2}$
Manufactured (including all articles of which Copper is a component of chief value), 4 $\frac{1}{2}$ ad valorem.	
" Ingots.	
" Lake. 16 $\frac{1}{2}$ @ 17	
" " Anchor" Brand. 16 @ 16	

Sheet and Bolt.
Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Not wider than	Weights per square foot and prices per pound.							
	Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30—72	25	25	25	26	27	28	31	33
30—72	25	25	25	26	28	30	34	33
36—96	25	25	25	27	29	33	36	35
36—96	25	25	27	29	31	35	38	37
48—96	25	25	28	30	32	36	40	39
60—96	25	26	31	37	—	—	—	—
84—96	26	27	—	—	—	—	—	—
84—96	27	28	—	—	—	—	—	—
Over 84 in. wide	28	30	—	—	—	—	—	—

Plumber's Brass Work.

Dia. per cent.	
Ground Bibbs and Stops.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Ground Stops, Hydrant Cocks, &c.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Corporation Cocks.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Corporation Cocks, "Mueller" Pattern, from Western list.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Ground Basin and Shampooing Cocks.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Compression Basin Cocks.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Compression Basin and Sink Cocks.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Compression Pantry Cocks.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Compression Double Basin and Shampooing Cocks.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Compression Double Bath Cocks.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Compression Bibbs, Urinal Cocks, Sill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Basin Plugs and Basin Grates.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Bath and Wash Tray Plugs.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Basin Clamps, Basin Joints and Strainers.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Boiler Couplings, Ground Face, per set	\$1.25
Boiler Couplings, Plain Face, per set	\$1.20
Water Back Valve and Plain Couplings, Soldering Nipples and Unions.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Union Joints.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Hydrant Noses, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Hose Goods.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$

Steam and Gas Fitters' Brass and Iron Work.

Discount per cent.	
Brass Globe Valves.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Finished Brass Globe Valves, with Brass Wheels.	40 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Globe Valves, with Patent Wood Wheels.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Globe Angle and Corner Valves.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Radiator Angle Valves.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Radiator Angle Valves, Frink's Patent.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Cross and Check Valves.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Check Valves.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Hose Valves.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass and Iron Frink Valves.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Safety Valves.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Vacuum Valves.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Whistle Valves.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Balance, Back Pressure and Foot Valves.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Butterfly and Throttle Valves.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Pump Valves.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Steam Cocks.	57 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Service, Meter and Union Meter Cocks.	57 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Whistles, Water Gauges & Oil Cups.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Hollow Plug, Tallow and Globe Oil Cups.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Lubricators.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Air Valves.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Air Cocks.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Gauge Cocks.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Cylinder Cocks and Steam Bibbs.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Swing Joints and Expansion Joints.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Test Pumps.	50 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Steam Fittings, Rough.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Steam Fittings, Finished.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Union Joints.	60 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Soldering Unions and Nipples.	55 $\frac{1}{2}$ to 10 $\frac{1}{2}$
Brass Hose Fittings, Fusible and Boiler Plugs.	55 $\frac{1}{2}$ to 10 $\frac{1}{2$